PB89-207203

Compilation and Speciation of National Emissions Factors for Consumer/Commercial Solvent Use Information Compiled to Support Urban Air Toxics Assessment Studies

(U.S.) Environmental Protection Agency, Research Triangle Park, NC

Apr 89

U.S. Department of Commerce
National Technical Information Service
NTIS

BIBLIOGRAPHIC INFORMATION

PB89-207203

Report Nos: EPA/450/2-89/008

Title: Compilation and Speciation of National Emissions Factors for Consumer/Commercial Solvent Use. Information Compiled to Support Urban Air Toxics Assessment Studies.

Date: Apr 89

Performing Organization: Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

Supplementary Notes: Portions of this document are illegible. See also PB86-238086.

NTIS Field/Group Codes: 68A, 68C, 43F

Price: PC A10/MF A01

Availability: Available from the National Technical Information Service,
Springfield, VA. 22161

Number of Pages: 209p

Keywords: *Air pollution control, *Hazardous materials, Volatility, State government, Local government, Aerosols, Paints, Insecticides, Solvents, Consumers, Protection, *Toxic substances, Volatile organic compounds.

Abstract: The report describes the methods used to prepare the volatile organic compound (VOC) species profiles for consumer and commercial products, and outlines measures to be used by state and local agencies to estimate consumer product-related VOC emissions in their jurisdictions.

PB89-207203

United States
Environmental Protection
Agency

Office of Air Quality
Planning And Standards
Research Triangle Park, NC 27711

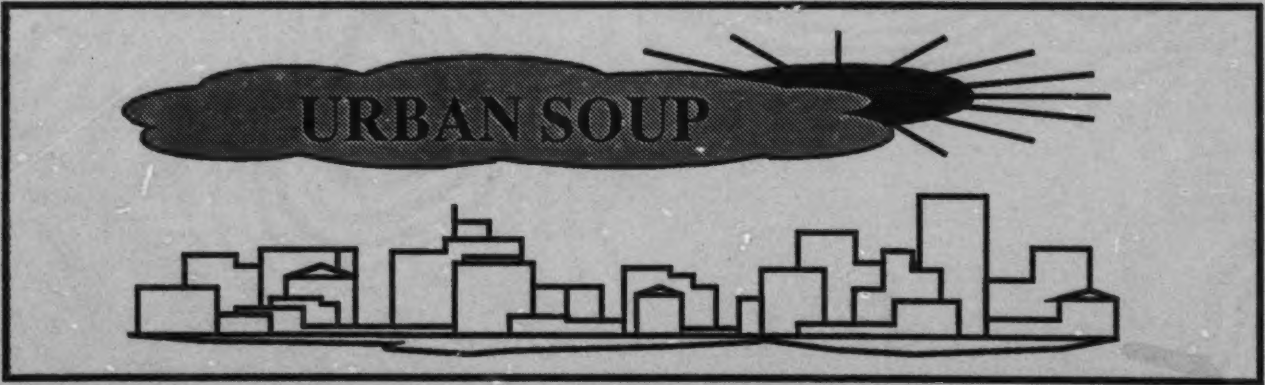
EPA-450/2-89-008
April 1989

AIR

EPA

COMPILATION AND SPECIATION OF NATIONAL EMISSIONS FACTORS FOR CONSUMER/COMMERCIAL SOLVENT USE

Information Compiled
To Support
Urban Air Toxics Assessment Studies



REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

EPA-450/2-89-008
April 1989

COMPILATION AND SPECIATION OF NATIONAL EMISSION FACTORS FOR CONSUMER/COMMERCIAL SOLVENT USE

Information Compiled
To Support
Urban Air Toxics Assessment Studies

U. S. ENVIRONMENTAL PROTECTION AGENCY
Office Of Air and Radiation
Office Of Air Quality Planning And Standards
Research Triangle Park, North Carolina 27711

ib

This report has been reviewed by the Office of Air Quality Planning and Standards, U. S. Environmental Protection Agency, and has been approved for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

EPA 450/2-89-008

TABLE OF CONTENTS

PAGE

1. INTRODUCTION 1-1
   1.1 Background 1-1
   1.2 Objectives 1-2
   1.3 Outline of the Report 1-2

2. METHODS FOR PREPARING VOC SPECIES PROFILES 2-1
   2.1 Selection of Product Subcategories 2-1
   2.2 Data Sources 2-5
      2.2.1 Chemical Composition 2-6
      2.2.2 Chemical and Physical Properties 2-6
      2.2.3 Geographic Distribution 2-9
      2.2.4 Market Share 2-9
   2.3 Determination of Volatility 2-10
      2.3.1 Relative Evaporation Rate Calculation 2-10
      2.3.2 Definition of "Volatile" 2-10
   2.4 Calculation of Weight and Volume Percents 2-11
   2.5 Assignment of SAROAD Codes 2-16
   2.6 Development of Composite Species Profiles 2-17

3. SPECIES PROFILES 3-1
   3.1 VOC Profile Summaries and Formulation Profiles 3-1
   3.2 Composite Profiles 3-24

4. METHODS FOR STATE AND LOCAL AGENCIES 4-1
   4.1 Inventory of Total VOC 4-1
      4.1.1 National Consumption 4-1
      4.1.2 Apportionment by States 4-5
   4.2 Inventory by Species 4-18

5. ISSUES AND CONCERNS 5-1

5.1 Composition Data 5-1

5.1.1 Formulation Data 5-1
5.1.2 Composite Species Profiles 5-2

5.2 Use Data 5-2

5.3 Per-Capita VOC Emission Factors 5-3

5.4 Alternative Methods for Estimating Total VOC Emissions 5-4

5.4.1 Automotive Product Emissions 5-4
5.4.2 Household-Based Apportionment 5-9

5.5 Alternative Methods for Estimating Speciated Emissions 5-9

6. REFERENCES 6-1

APPENDIX A - ORIGINAL CONSUMER PRODUCT CATEGORIES LIST
APPENDIX B - SPECIES PROFILES FOR INDIVIDUAL FORMULATIONS
APPENDIX C - RAW DATA ON CONSUMER PRODUCT FORMULATIONS

LIST OF TABLES

PAGE

2-1 Consumer Product Subcategories in Decreasing Order of Photochemically Reactive Organic Compound Emissions in California 2-3

2-2 Sources of Information on Product Formulations 2-7

2-3 Distribution of Air Pollutants by Consumer Product Subcategory 2-12

2-4 VCC Species Identified in Consumer Product Subcategories Investigated 2-14

2-5 Example of Calculation of Composite VOC Species Profile: Hair Sprays 2-19

3-1 Paints, Primers, and Varnishes Summary 3-3

3-2 Hair Sprays Summary 3-5

3-3 All Purpose Cleaners Summary 3-6

3-4 Insect Sprays Summary 3-7

3-5 Car Waxes and Polishes Summary 3-8

3-6 Room Deodorants and Disinfectants Summary 3-9

3-7 Caulking and Sealant Summary 3-10

3-8 Consumer Adhesives Summary 3-11

3-9 Moth Control Products Summary 3-12

3-10 Window and Glass Cleaners Summary 3-13

3-11 Herbicides and Fungicides Summary 3-14

3-12 Personal Deodorants Summary 3-15

3-13 Auto Antifreeze Summary 3-16

3-14 Carburetor and Choke Cleaners Summary 3-17

3-15 Brake Cleaners Summary 3-18

3-16 Engine Degreasers Summary 3-19

3-17 Engine Starting Fluids Summary 3-20

3-18 Rug and Upholstery Cleaners Summary 3-21

3-19 Lubricants and Silicones Summary 3-22

PAGE

3-20 Metal Cleaners and Polishes Summary 3-23

3-21 Composite VOC Species Profile for Caulking and Sealing Compounds 3-25

3-22 Composite VOC Species Profile for Window and Glass Cleaners 3-26

3-23 Composite VOC Species Profile for Room Deodorants and Disinfectants 3-27

3-24 Composite VOC Species Profile for Hair Sprays 3-28

3-25 Composite VOC Species Profile for Engine Starting Fluids 3-29

3-26 Composite VOC Species Profile for Interior Water-Based Architectural Coatings 3-30

3-27 Composite VOC Species Profile for Interior Solvent-Based Architectural Coatings 3-31

3-28 Composite VOC Species Profile for Exterior Water-Based Architectural Coatings 3-32

3-29 Composite VOC Species Profile for Exterior Solvent-Based Architectural Coatings 3-33

3-30 Composite VOC Species Profile for Aerosol Coatings 3-34

4-1 Update of Consumer Product Use Estimates to 1986 4-4

4-2 National VOC Emissions, by Consumer Product Subcategory, 1986 4-6

4-3 Definition of Marketing Regions 4-9

4-4 Per-Capita Consumption and VOC Emissions by Marketing Region and Consumer Product Sub-Category 4-10

4-5 Total Per-Capita Consumer Product Emissions, by Marketing Region 4-17

5-1 VOC Emission Factors for Automotive Products, 1986 5-5

5-2 State-Specific VOC Emissions Due to Use of Consumer Products 5-6

5-3 VOC Emissions from Use of Automotive Products in Selected Counties 5-8

5-4 Per-Household Emission Factors for Four Types of Consumer Products 5-10

SECTION 1
INTRODUCTION

1.1 BACKGROUND

Emission factors have been published routinely in documents such as **Compilation of Air Pollutant Emission Factors, AP-42,** which are used in preparation of State Implementation Plans (SIPs), review of Prevention of Significant Deterioration (PSD) applications, and other Federal, State and local agency assessments of air pollution sources. Until recently, emission factors were generally available only for "criteria pollutants," such as carbon monoxide and oxides of nitrogen (NO_x). In response to increasing concern over potentially toxic air contaminants, regulatory agencies at all levels are now developing inventories of emissions of individual chemical species.

The Noncriteria Pollutant Programs Branch (NPPB) of the Air Quality Management Division, Office of Air Quality Planning and Standards, has responsibility within the U.S. Environmental Protection Agency (EPA) to support EPA, State, and local air toxics assessment and mitigation programs. Recent NPPB publications which are useful for estimating air toxics emissions include **Compiling Air Toxics Emission Inventories** [46]; **Toxic Air Pollutant Emission Factors—A Compilation for Selected Air Toxic Compounds and Sources** [44]; the **Air Emissions Species Manual** [21]; and the series **Locating and Estimating Emissions of...**, which currently covers 16 compounds and compound classes.

Information on the species composition of volatile organic compound (VOC) emissions from use of consumer and commercial products has not been readily available. The second edition of the **VOC Species Data Manual** included only three consumer product categories (architectural surface coatings, general domestic solvents, and pesticides). Speciated emission estimates for major product categories (paints and coatings, personal care products, and automotive products) were presented in a California Air Resources Board report entitled **Development and Improvement of Organic Compound Emission Inventories for California** [42]. A recent study for EPA Region II, **Photochemically Reactive Organic Compound (PROC) Emissions from Consumer and Commercial Products** [1], included development of a data base on the chemical composition of 11 widely-used consumer and commercial products, as well as estimates of emissions of PROC in California, New York and New Jersey. Both similarities and differences with published EPA per-capita consumer product emission factors were found.

1.2 OBJECTIVES

The objectives of this study were to expand the consumer product data base developed for Region II, review existing and new data, and revise existing emission factors and species profiles, as warranted. The focus was to be upon all organic compounds meeting a certain volatility criterion, whether or not they are "photochemically reactive" by EPA or State definitions. Of special interest were those compounds considered or suspected to be air toxics. In addition, methods which State and local regulatory agencies could use in preparing consumer product emission inventories were to be developed.

1.3 OUTLINE OF THE REPORT

This report is divided into five sections. Section 1 contains this introduction. Section 2 describes the methods used to prepare the VOC species profiles for consumer and commercial products. The profiles are then presented in Section 3. Section 4 outlines measures to be used by State and local agencies to estimate consumer product-related VOC emissions in their jurisdictions. Uncertainties in the species profiles and per-capita emissions estimates are discussed in Section 5. Finally, references for the report are presented in Section 6.

NOTICE

THIS DOCUMENT HAS BEEN REPRODUCED FROM THE BEST COPY FURNISHED US BY THE SPONSORING AGENCY. ALTHOUGH IT IS RECOGNIZED THAT CERTAIN PORTIONS ARE ILLEGIBLE, IT IS BEING RELEASED IN THE INTEREST OF MAKING AVAILABLE AS MUCH INFORMATION AS POSSIBLE.

SECTION 2
METHODS FOR PREPARING VOC SPECIES PROFILES

2.1 SELECTION OF PRODUCT SUBCATEGORIES

In order to place this investigation in perspective, it is necessary to understand how consumer and commercial product information was organized. In the predecessor study [1], Science Applications International Corporation (SAIC) investigated 11 aerosol and nonaerosol product "categories:"

Aerosol Spray Products

(1) Insect sprays
(2) Paints and finishes
(3) Household products
(4) Personal products
(5) Animal products
(6) Automotive and industrial products
(7) Food products
(8) Miscellaneous products

Nonaerosol Products

(1) Personal products
(2) Household products
(3) Garage products

Each of these categories was then divided into "subcategories." For example, aerosol household products comprised room deodorants and disinfectants, all-purpose cleaners, starch and fabric finishes, rug and upholstery cleaners, spot removers, carpet deodorizers, shoe polishes, window and glass cleaners, tile and bathroom cleaners, oven cleaners and drain openers. The consumer product categories and subcategories investigated by Jones et al. [1] are listed in Appendix A.

Ideally, the present study would have concentrated on those consumer product subcategories known *a priori* to be the largest sources of air toxics emissions. As detailed and comprehensive quantitative information on air toxics emissions from consumer products was not available, Jones et al.'s ranking of consumer product subcategories by their photochemically reactive organic compound (PROC) emission potential was used instead. The approach's inherent bias in favor of those subcategories in which PROCs comprise a high fraction of total VOC is discussed in Sections 4 and 5.

Table 2-1 lists the original 47 subcategories in decreasing order of photochemically reactive organic compound (PROC) emissions, as determined by Jones et al. [1]. (In preparing this table, we excluded the previous report's estimate of the portion of adhesives-based emissions which may be attributable to industrial uses.) As seen in the table, 11 subcategories accounted for 75 percent of the PROC emissions, and 20 subcategories accounted for 90 percent. The highest priority was therefore given to the following subcategories:

- Paints, primers, and varnishes
- Hair sprays
- All-purpose cleaners
- Insect sprays
- Car polishes and waxes
- Room deodorants and disinfectants
- Adhesives
- Caulking and sealing compounds
- Moth control products
- Window and glass cleaners
- Herbicides and fungicides

Second priority was given to the following:

- Personal deodorants
- Auto antifreezes
- Carburetor and choke cleaners
- Brake cleaners
- Engine degreasers

Table 2-1

CONSUMER PRODUCT SUBCATEGORIES IN DECREASING ORDER OF PHOTOCHEMICALLY REACTIVE ORGANIC COMPOUND EMISSIONS IN CALIFORNIA, 1985

Rank in California		Product Form[a]	Pct. of Total PROC	Cumulative Percent
1	Paints, Primers, and Varnishes	A/N	16.5	16.5
2	Hair Sprays	A	11.1	27.6
3	All Purpose Cleaners	A	9.7	37.3
4	Insect Sprays	A/N	8.0	45.3
5	Car Polishes and Waxes	N	6.9	52.2
6	Room Deodorants and Disinfectants	A	6.3	58.5
7	Caulking and Sealing Compounds	A/N	5.3	63.8
8	Adhesives (Consumer)	N	3.6	67.4
9	Moth Control Products	A/N	3.1	70.5
10	Window and Glass Cleaners	A/N	3.0	73.5
11	Herbicides and Fungicides	A/N	2.7	76.2
	75 Percent			
12	Personal Deodorants	A	2.4	78.6
13	Auto Antifreezes	N	1.8	80.4
14	Carburetor and Choke Cleaners	A	1.5	81.9
15	Brake Cleaners	A	1.6	83.5
16	Engine Degreasers	A	1.5	85.0
17	Engine Starting Fluids	A	1.4	86.4
18	Rug and Upholstery Cleaners	A	1.4	87.8
19	Lubricants and Silicones	A	1.4	89.2
20	Metal Cleaners and Polishes	N	1.0	90.2
	90 Percent			
21	Waxes and Polishes	A	0.9	91.1
22	Tile and Bathroom Cleaners	A	0.9	92.0
23	Pharmaceuticals	A	0.8	92.8
24	Styling Mousse	A	0.8	93.6
25	Windshield Deicer	A/N	0.8	94.4
26	Insect Repellents	A/N	0.6	95.0
27	Starch and Fabric Finish	A	0.5	95.5
28	Auto Cleaners	A/N	0.5	96.0
29	Floor Waxes or Polishes	N	0.5	96.5
30	Colognes	A	0.5	97.0
31	Shaving Lathers	A	0.4	97.4
32	Animal Insecticides	A	0.4	97.8

Table 2-1

CONSUMER PRODUCT SUBCATEGORIES IN DECREASING ORDER OF PHOTOCHEMICALLY REACTIVE ORGANIC COMPOUND EMISSIONS IN CALIFORNIA (Continued)

Rank in California		Product Form[a]	Pct. of Total PROC	Cumulative Percent
33	Aftershaves	A	0.3	98.1
34	Undercoatings	A	0.2	98.3
35	Oven Cleaners	A/N	0.3	98.6
36	Shoe Polishes, Waxes and Colorants	A/N	0.3	98.9
37	Paints-Other Related Products	A	0.3	99.2
38	Perfumes	A	0.2	99.4
39	Spot Removers	A/N	0.1	99.5
40	Waxes and Polishes - Liquids	N	0.2	99.7
41	Hair Care Products - Shampoos	A/N	0.1	99.8
42	Carpet Deodorizers	A/N	0.1	99.9
43	Suntan Lotions	A	0.0	99.9
44	Hair Removers	A	0.0	99.9
45	Anti-Static Sprays	A	0.1	100.0
46	Prewash Stain Removers	A/N	0.0	100.0
47	Drain Openers	A/N	0.0	100.0

Source: Reference 1.

[a] A = aerosol, N = nonaerosol, A/N = aerosol and/or nonaerosol.

- Engine starting fluids
- Rug and upholstery cleaners
- Lubricants and silicones
- Metal cleaners and polishes

The final unit for organizing emissions data was the "formulation," or mix of ingredients. For a given product subcategory, up to 100 formulations may be commercially available. All known formulations for each subcategory were included in this investigation.

For the paints, primers and varnishes subcategory, "formulation" has a different meaning than it has for the other consumer product subcategories. The data source for this subcategory [11] reported aggregated national use of various organic solvents in 17 types of architectural coatings and in aerosol coatings. For the present study, each type of coating (e.g. water-based interior flat paint) is defined as a formulation. Recent data were available only for the VOC content of the formulations, and not for the other coating ingredients, such as water and nonvolatile solids.

2.2 DATA SOURCES

Five types of information were needed for this study:

- Chemical composition of the consumer products of interest;
- Chemical and physical properties (to determine whether a compound may be classified as a VOC);
- National use;
- Geographic distribution of use; and
- Market share of competing formulations

2.2.1 Chemical Composition

Table 2-2 lists the principal sources of information on formulations for the subcategories of interest. Complete citations are found in Section 6. Because product compositions change quite frequently, we attempted to obtain the most recent editions of each of the cited publications.

In many cases, product ingredients were reported in the form of trade names, such as "Arlacel 80 emulsifier" or "SDA alcohol No. 40." Chemical descriptions of many of these accompanied some of the formularies. However, in many cases it was necessary to identify and contact the raw ingredient manufacturer for more information. Names of manufacturers and suppliers were obtained from the following sources:

- **Trademarks and Product Names Reported in Conjunction with The Chemical Substance Initial Inventory. Trademarks and Product Names Section** [2]
- **Chemcyclopedia** [3]
- **Chemicalweek Buyer's Guide Issue 1987** [4]

Proprietary names which could not be identified by these sources were searched in the CHEMNAME on-line data base, which was available through Dialog Information Services, Inc. This source provides Chemical Abstracts Service (CAS) registry numbers and molecular weights of many trade-name chemicals. The CAS numbers were then used to search other references.

2.2.2 Chemical and Physical Properties

In order to determine whether a given compound should be considered "volatile," knowledge of its molecular weight and vapor pressure was necessary (see Section 2.3). Molecular weights were obtained from the **CRC Handbook of Chemistry and Physics** [5], the **Handbook of Environmental Data on Organic**

Table 2-2
SOURCES OF INFORMATION ON PRODUCT FORMULATIONS

Subcategory	References
Paints, primers, and varnishes	11
Hair sprays	12
All-purpose cleaners	13
Insect sprays	14, 15, 16
Car polishes and waxes	13
Room deodorants and disinfectants	14
Adhesives	14
Caulking and sealing compounds	17
Moth control products	18
Window and glass cleaners	13
Herbicides and fungicides	17
Personal deodorants	12
Auto antifreezes	17
Carburetor and choke cleaners	15, 16, 17
Brake cleaners	17
Engine degreasers	13
Engine starting fluids	17
Rug and upholstery cleaners	13
Lubricants and silicones	17
Metal cleaners and polishes	13

Chemicals [6], and the on-line data base HEILBRON, which was accessed through Dialog Information Services, Inc. The HEILBRON data base summarizes information from the **Dictionary of Organic Compounds, 5th Edition.** In some cases, molecular weights were calculated from molecular formulas found in the EPA series Toxic **Substances Control Act Chemical Substances Inventory, Volumes II, III** [7], and **Cumulative Supplement** [8]. Vapor pressures at 20°C were obtained from References 5 and 6, and from **Vapor Pressure Distribution of Selected Organic Chemicals** [9]. In several cases, material safety data sheets, which report molecular weight and vapor pressure, were obtained from chemical manufacturers and distributors.

Vapor pressures not available through one of the previously mentioned sources were computed by using the following formula from the **CRC Handbook of Chemistry and Physics**, which relates a compound's vapor pressure at 20°C to its boiling point at 760 mm Hg atmospheric pressure [10]:

$$2.8808 - \log p = \frac{\phi \Delta t}{293.1 - 0.15 \Delta t} \qquad (2\text{-}1)$$

where

Δt = boiling point at 760 mm Hg (°C) − 20°C
$\log p$ = common logarithm of observed pressure in mm Hg
ϕ = entropy of vaporization at 760 mm Hg.

The entropy of vaporization (which is the heat of vaporization divided by the absolute temperature at vaporization) was determined from a set of curves presented in Reference 10. For compounds whose boiling points are reported at a pressure different from 760 mm Hg, the boiling point at 760 mm Hg must first be iteratively obtained from a rewritten form of Equation 2-1:

$$B_{760} = \frac{B_p + (273.1 + B_p)(2.8808 - \log p)}{[\phi + 0.15(2.8808 - \log p)]} \qquad (2\text{-}2)$$

where B_p is the observed boiling point ($^{\circ}C$) at pressure p (mm Hg). Since the entropy of vaporization is a function of the boiling point, Equation 2-2 must be solved iteratively until successive values of B_{760} are within a pre-decided difference; in this case, we used $0.1^{\circ}C$.

2.2.3 Geographic Distribution

The geographic distribution of consumer product use and associated VOC emissions was assumed to depend upon both population and a measure of regional consumer preference. For example, market research surveys have found that the proportion of households in the Northeast which use household cleaners is about 8 percent higher than the national average [19]. Per capita consumption would thus be expected to be slightly higher in the Northeast than in the U.S. as a whole. Consumer preference data were obtained from the **Simmons 1985 Study of Media and Markets** [19], which is based upon an extensive survey of U.S. consumers. State population estimates for 1986 were obtained from the CENDATA on-line data base, which is provided by the U.S. Bureau of the Census. How preference measures and population estimates were used to calculate geographic distribution is described in Section 4.1.1.

2.2.4 Market Share

Information on the percentage of the total market associated with each formulation is necessary for calculating both total VOC and speciated emissions from use of a given subcategory of consumer products. Unfortunately, no market share data were available for the brands for which detailed composition data were collected. Brand-name market share data were available through the aforementioned Simmons market study [19]. However, the composition information for those particular brands was inadequate for use in this compilation. This matter is discussed further in Section 5.1.

2.3 DETERMINATION OF VOLATILITY

2.3.1 Relative Evaporation Rate Calculation

The relative evaporation rate (RER) was used as a measure of the volatility of the ingredients of the consumer products in this compilation. The RER is defined as [20]:

$$\text{RER} = 0.8217 \times (\text{Vapor Pressure at } 20^{\circ}\text{C}) \times (\text{Molecular Weight})^{0.5} \quad (2\text{-}3)$$

This index expresses the evaporation rate of a compound relative to that of n-butyl acetate, for which RER = 100.

2.3.2 Definition of "Volatile"

Vapor pressures and molecular weights determined through the methods described in Section 2.2.2 were substituted into Equation 2-3. Selection of a dividing line between "volatile" and "nonvolatile" was of necessity arbitrary, since volatility was quantified by a relative measure. The lower limit of volatility was set at RER = 0.1, or three orders of magnitude below that of n-butyl acetate. Examination of compounds whose RERs lay on either side of this boundary confirmed that the choice was reasonable. Most of the compounds having RER < 0.1 were solids at ambient temperatures or were polar liquids with boiling points above 200°C. Compounds whose RERs slightly exceeded 0.1 were liquids which are generally considered to be volatile, such as ethylene glycol and propylene glycol. Note that volatility does not imply photochemical reactivity.

Data for calculating RERs were unavailable for many of the consumer product ingredients. We therefore made the following assumptions:

- **Nonvolatile compounds:** waxes, oils, polymers, resins, and some esters
- **Volatile compounds:** mineral spirits, Stoddard solvent, kerosene, and mixtures of known volatile compounds

Table 2-3 lists all of volatile organic compounds (VOCs) identified as constituents of the formulations in the consumer product subcategories of interest, and shows which compounds are associated with each consumer product subcategory. Compounds which are considered in this report to be "air toxics" are marked with asterisks. The criterion for designation of a consumer product ingredient as an "air toxic" was that it appears on the list compiled by the California Air Resources Board under the California Air Toxics "Hot Spots" Information and Assessment Act of 1988 (Assembly Bill 2588); this list is quite comprehensive, and includes (among other things) substances reviewed, under review, or scheduled for review as air toxics or potential air toxics by the EPA's Office of Air Quality Planning and Standards.

Table 2-4 shows the Chemical Abstracts Service (CAS) number, the Storage and Retrieval of Aerometric Data (SAROAD) number, and relevant physical properties of each compound, including its calculated RER.

2.4 CALCULATION OF WEIGHT AND VOLUME PERCENTS

To construct the species profiles (presented in Section 3), it was necessary to calculate the weight and volume percentage of each VOC species in each formulation. Most of the formularies included weight percentages for all (volatile and nonvolatile) constituents. For many formulations, the percentages of some ingredients were reported as ranges, e.g. "10 to 50 percent;" in these cases, we used the midpoints of the stated ranges.

Two types of weight percentages were calculated. First, the "Percent VOC by Weight" was defined as the sum of the percentages of all VOCs in the formulation. For example, the reported composition of Formulation 10 in the Window and Glass Cleaners subcategory was [13]:

Raw Material	**Pct. by Weight**
Miranol JEM Concentrate Surfactant	0.30
Iso-propyl Alcohol	8.00
Butyl Cellosolve	1.00
Water	90.70

Table 2-3

DISTRIBUTION OF AIR POLLUTANTS BY CONSUMER PRODUCT SUBCATEGORY

Compound	Consumer Product Subcategory[a]																			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
Acetone								X						X						
Alcohol 740 P								X												
Aliphatic Hydrocarbons	X													X					X	
Aliphatic Petroleum Distillates											X									
Amyl Acetate								X												
Aromatic Hydrocarbons											X									
Aromatic Petroleum Solvent											X									
Benzotriazole																				X
N-Butane				X		X				X		X		X						
*2-(2-Butoxyethoxy)-ethanol	X		X																	
*Butyl Cellosolve	X		X							X						X		X		X
L-Camphor								X												
Cellosolve Acetate	X																			
Complex Amines														X						
*Cresol (o-,m-,p-)														X						
DDVP				X																
O-Dichlorobenzene														X						
*P-Dichlorobenzene									X											
*Dichlorodifluoromethane		X																		
Diethylaminoethanol					X															
Diethylene Glycol													X							
Diethylphthalate		X																		
Dipropylene Glycol Monomethyl Ether																				X
Essential Oil		X																		
Ethanolamine			X													X				
Ethyl Alcohol		X				X						X		X	X					X
*Ethylene Dichloride														X						
Ethylene Glycol	X							X					X							
Ethyl Ether																	X			
*Glycol Ethers (various)	X																			
"Inert Ingredients" (Pesticides)				X					X		X									
Isobutane				X						X		X						X		
Isoparaffinic Solvent									X											
Iso-propyl Alcohol	X	X	X		X	X	X			X					X	X		X		X
Kerosene			X	X	X											X				X
Methyl Alcohol										X				X	X					X
*Methyl Cellosolve			X																	
*Methylene Chloride	X	X				X								X						
Methyl p-Hydroxybenzoate																				X

Table 2-3

DISTRIBUTION OF AIR POLLUTANTS BY CONSUMER PRODUCT SUBCATEGORY

(Continued)

Compound	Consumer Product Subcategory[a]																			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
Mineral Spirits	X		X		X											X				X
Morpholine					X															
Nitropropane (1-,2-)								X												
Nonylphenoxy Acetic Acid																			X	
Oxygenated Organic Acids																			X	
*Perchloroethylene																X				
Perfume			X			X				X								X		X
Petroleum Distillate (Naphtha)				X					X		X									
Petroleum Oil								X												
Petroleum Solvents																				
Pine Oil			X	X												X				X
Propane										X		X								
Propylene Glycol	X		X			X						X								X
*Propylene Glycol Butyl Ether			X																	
"Solvents"					X															
Terpineol			X																	X
Tetrahydrofurfuryl Alcohol														X						
Thioglycolic Acid																				X
*Toluene	X							X						X						
*1,1,1-Trichloroethane	X																			
*Trichloroethylene																				X
*Trichlorofluoromethane		X																		
Tricresyl Phosphate								X											X	
VM&P Naphtha	X		X																	X
*Isomers of Xylene	X						X							X						

[a] KEY:

A = Paints, Primers and Varnishes
B = Hair Sprays
C = All Purpose Cleaners
D = Insect Sprays
E = Car Waxes and Polishes
F = Room Deodorants and Disinfectants
G = Caulking and Sealing Compounds
H = Consumer Adhesives
I = Moth Control Products
J = Window and Glass Cleaners
K = Herbicides and Fungicides
L = Personal Deodorants
M = Auto Antifreezes
N = Carburetor and Choke Cleaners
O = Brake Cleaners
P = Engine Degreasers
Q = Engine Starting Fluids
R = Rug and Upholstery Cleaners
S = Lubricants and Silicones
T = Metal Cleaners and Polishes

Table 2-4

VOC SPECIES IDENTIFIED IN CONSUMER PRODUCT SUBCATEGORIES INVESTIGATED

Constituents	CAS Number	SAROAD Number	Molecular Weight	Vapor Pressure (mm Hg)	RER
Acetone	67-64-1	43551	58.08	132.49	829.68
Alcohol 740 P		43300	50.00	50.00	290.51
Aliphatic Hydrocarbons		43000	86.17	50.00	381.38
Amyl Acetate	628-63-7	43436	130.20	3.05	28.60
Aromatic Hydrocarbons		45000	92.10	22.00	173.49
Benzotriazole	95-14-7	45707	119.13	.02	.18
N-Butane	106-97-8	43212	58.12	1544.67	9676.36
2-(2-Butoxyethoxy)-ethanol	112-34-5	43312	162.18	.01	.10
Butyl Cellosolve	111-76-2	43308	118.17	.60	5.36
L-Camphor	76-22-2	43571	152.24	.28	2.84
Cellosolve Acetate	11-115-9	43452	132.16	2.00	18.89
Cresol (O-,M-,P-)	1319-77-3	45605	108.14	.11	.94
DDVP	62-73-7	99919	220.98	.01	.12
O-Dichlorobenzene	95-50-1	45805	147.01	.89	8.87
P-Dichlorobenzene	106-46-7	45807	147.01	.89	8.87
Dichlorodifluoromethane	75-71-8	43823	120.91	1216.00	10986.97
Diethylaminoethanol	100-37-8	43739	117.19	1.40	12.45
Diethylene Glycol	111-46-6	43373	106.12	.01	.08
Diethylphthalate	84-66-2	43453	222.20	4.23	51.81
Dipropylene Glycol Monomethyl Ether	34590-94-8	43353	162.23	.46	4.81
Essential Oil			50.00	50.00	290.51
Ethanolamine	141-43-5	43777	61.08	.40	2.57
Ethyl Alcohol	64-17-5	43302	46.07	43.90	244.84
Ethylene Dichloride	107-06-2	43815	99.00	61.00	498.72
Ethylene Glycol	107-21-1	43370	62.07	.06	.39
Ethyl Ether	60-29-7	43351	74.12	442.00	3126.82
"Inert Ingredients" (Pesticides)					1511.56
Isobutane	75-28-5	43214	58.12	1566.19	9811.16
Isoparaffinic Solvent		43100	86.18	168.34	1284.09
Iso-propyl Alcohol	67-63-0	43304	60.10	34.82	221.81
Kerosene	8008-20-6	43125	168.00	.48	5.08
Methyl Alcohol	67-56-1	43301	32.04	92.39	429.72
Methyl Cellosolve	109-86-4	43310	76.11	6.20	44.45
Methylene Chloride	75-09-2	43802	84.93	349.00	2642.83
Methyl p-Hydroxybenzoate	99-76-3	45478	152.14	.07	.71
Mineral Spirits	8032-32-4	43118	114.00	50.00	438.67
Morpholine	110-91-8	43742	87.12	8.00	61.36
Nitropropane (1-,2-)	79-46-9	43755	89.09	9.38	72.75
Nonylphenoxy Acetic Acid	3115-49-9	43411	50.00	50.00	290.51
Oxygenated Organic Acids		43400	50.00	50.00	290.51

Table 2-4

VOC SPECIES IDENTIFIED IN CONSUMER PRODUCT SUBCATEGORIES INVESTIGATED (Continued)

Constituents	CAS Number	SAROAD Number	Molecular Weight	Vapor Pressure (mm Hg)	RER
Perchloroethylene	127-18-4	43817	165.83	14.00	148.14
Perfume			50.00	50.00	290.51
Petroleum Distillate (Naphtha)		45101	114.00	50.00	438.67
Petroleum Oil		43000	50.00	50.00	290.51
Petroleum Solvents		43000	50.00	50.00	290.51
Pine Oil	8002-09-3		136.23	3.00	28.77
Propane	74-98-6	43204	44.09	6460.00	46.38
Propylene Glycol	57-55-6	43369	76.00	.10	.72
Propylene Glycol Butyl Ether	5131-66-8	43354	132.20	.60	5.67
"Solvents"		43100	50.00	50.00	290.51
Terpineol	8000-41-7	43355	154.11		
Tetrahydrofurfuryl Alcohol	97-99-4	43321	102.13	2.30	19.10
Thioglycolic Acid	68-11-1	43909	92.11	10.00	78.86
Toluene	108-88-3	45202	92.13	21.48	169.41
1,1,1-Trichloroethane	71-55-6	43814	133.42	100.00	949.13
Trichloroethylene	79-01-6	43824	131.40	66.08	622.42
Trichlorofluoromethane	75-69-4	43811	137.38	1677.04	16151.71
Tricresyl Phosphate	1330-78-5	45479	368.37	.50	7.89
VM&P Naphtha	8032-32-4	45101	116.00	4.70	41.59
Isomers of Xylene	1330-20-7	45102	106.16	5.00	42.33

In this product, only iso-propyl alcohol and butyl cellosolve are VOCs. The percent VOC by weight is therefore 9.0.

In addition, we calculated the percent of total VOC accounted for by each VOC species. In the above example, the weight percentage of iso-propyl alcohol is 100 (8/9) = 88.89 percent, and that of butyl cellosolve is 100 (1/9) = 11.11 percent.

For the species profiles, the volume percentage of a given species was defined as its percentage of total moles of VOC. In the above example, for every 100 g of VOC, there are 88.89 g of iso-propyl alcohol and 11.11 g of butyl cellosolve. Since the molecular weights of the two constituents are 60.10 and 118.17, respectively:

Moles isopropyl alcohol = (88.89 g)/(60.10 g/mole) = 1.479 moles
Moles EGMBE = (11.11 g)/(118.17 g/mole) = 0.0940 moles

Total moles = 1.479 + 0.0940 = 1.573 moles

The volume percent of isopropyl alcohol is thus 100(1.479/1.573) = 94.02, and that of EGMBE is 100(0.0940/1.573) = 5.98.

2.5 ASSIGNMENT OF SAROAD CODES

To be consistent with previously published VOC species profiles, it was necessary to assign Storage and Retrieval of Aerometric Data (SAROAD) codes to each of the VOC species found to be present in the consumer product subcategories of interest. Most of the SAROAD numbers were obtained from Table D-1 of the Air Emissions Species Manual, Volume I [21]. Additional codes were assigned by EPA and SAIC. Some of the consumer product ingredients were identified only as broad classes of compounds, such as "aromatic hydrocarbons." In these cases, the nearest appropriate two- or three-digit SAROAD numbers (e.g. 43000 for aromatic hydrocarbons) were used.

2.6 DEVELOPMENT OF COMPOSITE SPECIES PROFILES

Composite species profiles for each consumer product subcategory could be calculated if market share data were available. Suppose that a given subcategory has n formulations, each of which comprises up to k VOC species. Let i and j denote formulations and species, respectively, and consider the following definitions:

C = Total use of the consumer product
m_i = The fractional market share of the ith formulation
v_i = The fraction of VOC in the ith formulation
w_{ij} = The fraction of compound j in the VOC in the ith formulation

The following relationships hold by definition:

$$\sum_i m_i = 1 \qquad (2\text{-}4)$$

$$\sum_j w_{ij} = 1 \qquad (2\text{-}5)$$

Total VOC emissions from all formulations are equal to:

$$\text{Total VOC} = C \sum_i m_i v_i \qquad (2\text{-}6)$$

The emissions of pollutant j from formulation i are:

$$E_{ij} = w_{ij} m_i v_i C \qquad (2\text{-}7)$$

National emissions of pollutant j are thus:

$$E_j = \sum E_{ij} = C \sum_i w_{ij} m_i v_i \qquad (2\text{-}8)$$

The fraction of all VOC emissions represented by pollutant j is therefore:

$$F_j = E_j/(\text{Total VOC}) = \frac{\sum_i w_{ij}\, m_i\, v_i}{\sum_i m_i\, v_i} \qquad (2\text{-}9)$$

As was noted in Section 2.2.4, market share data were not readily available. It is therefore not possible at this time to obtain precise composite species profiles. However, for those consumer products for which product composition does not vary tremendously from formulation to formulation, an approximate composite species profile may be obtained by assuming equal market share. Since m_i is the same for all formulations, it becomes a constant and may be dropped from Equation 2-9:

$$F_j = \frac{\sum_i w_{ij}\, v_i}{\sum_i v_i} \qquad (2\text{-}10)$$

An example of a subcategory for which this approximation may be made is Hair Sprays. Two of the seven VOC species are present in 18 of the 19 formulations, while 1 of the compounds is in 11. Table 2-5 shows how the composite profile for hair sprays was calculated. Composite profiles for several consumer product subcategories are presented in Section 3.2.

Table 2-5
EXAMPLE OF CALCULATION OF COMPOSITE VOC SPECIES PROFILE:
HAIR SPRAYS

Formulation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
VOC Fraction (v_i)	.970	.970	.960	.960	.960	.960	.970	.970	.908	.970	.960	.960	.950	.950	.999	.939	.960	.980	.660	
Compound										$(w_{i,j}\ v_i)$										Weight Pct.
Dichlorodifluoromethane	.501	.501	.500	.500	.500	.500	.501	.250	0.000	.301	.353	.334	.351	.360	.300	.300	.300	.350	.030	37.48
Dichloromethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.150	.250	.100	.150	.100	0.000	0.000	0.000	0.000	4.18
Diethylphthalate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.001	0.000	0.000	0.000	0.000	0.000	.01
Essential Oil	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.003	.003	.003	.003	.003	.003	.003	.003	0.000	0.000	.13
Ethanol	.469	.469	.460	.460	.460	.460	.469	.468	.855	.366	.100	.040	.347	.396	0.000	.336	.357	.280	.280	39.40
Isopropanol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.053	0.000	0.000	0.000	0.000	0.000	.296	0.000	0.000	0.000	0.000	1.94
Trichlorofluoromethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.250	0.000	.301	.353	.334	.150	.040	.300	.300	.300	.350	.350	16.86

Reproduced from
best available copy.

SECTION 3
SPECIES PROFILES

3.1 VOC PROFILE SUMMARIES AND FORMULATION PROFILES

This section contains 20 tables, one for each of the consumer product subcategories investigated. Each table consists of two parts. The first part lists the formulations (by number) and gives the weight percent VOC for each. In this case, "weight percent VOC" means the percentage of VOC in the **entire formulation.** At the bottom of the list, the range of VOC percentages is reported. Note that for several consumer product subcategories, many formulations contain no VOC; they comprise inorganic compounds or organic compounds which did not meet the volatility criterion defined in Section 2.3.2. Note also that all of the paint, primer and varnish "formulations" have 100 percent VOC. That is because, as was explained in Section 2.1, composition data were available only for the VOC portion of the coating formulations.

The second part of each table summarizes information on the VOC species present in the formulations corresponding to the consumer product subcategory. Each species is listed along with its SAROAD and CAS numbers. To give an idea of the relative importance of each species, the number of formulations in which it is an ingredient is reported. Finally, the table shows the ranges of percentages **of total VOC** represented by each compound **when it is present** in a formulation. Given this information, the percentage of the species in a formulation may be calculated as follows:

Pct. in Formulation = (VOC pct. in formulation) x (Species pct of VOC)

For example, in hair sprays (Table 3-2), ethyl alcohol represents about 4.2 to 93 percent of the VOC. The VOC content of hair sprays ranges from 66 to 99.9 percent. A rough estimate of the range of ethyl alcohol concentration may be estimated as follows:

Minimum = (0.66)(0.042)(100) = 2.8 percent
Maximum = (0.999)(0.93)(100) = 92.9 percent

Thus each pound of emissions from hair spray would contain 0.028 to 0.929 lb of ethyl alcohol. The breadth of this range is, unfortunately, not unusual. For paints, primers and varnishes, the "VOC percent in formulation" is always 100, since only the VOC data were available.

More detailed information on the species composition within each consumer product subcategory is presented in Appendices B and C. Appendix B shows, for each formulation within each subcategory, the weight percent VOC and the weight and volume percentage of total VOC represented by each species. For example, hair spray Formulation No. 9 contains 90.8 percent VOC by weight; of this total VOC, 92.55 percent is ethyl alcohol and 7.45 percent is iso-propyl alcohol. The weight percentages of the two species in the entire formulation are:

Ethyl alcohol: (0.9255)(0.908)(100) = 84.0 percent
Iso-propyl alcohol: (0.0745)(0.908)(100) = 6.8 percent

Finally, Appendix C contains the raw data for each formulation and shows the calculation of weight and volume percentages. Information presented includes, for each formulation:

- VOC species present
- Percent of total formulation weight for each VOC species
- Total percent VOC
- Molecular weights, SAROAD codes and CAS numbers
- Each species' percent of total VOC mass
- Moles of each species per 100 g of the formulation
- Each species' percent of total VOC volume

Table 3-1

PAINTS, PRIMERS, VARNISHES SUMMARY

Formula	Pct.VOC by Wt.
1	100.0
2	100.0
3	100.0
4	100.0
5	100.0
6	100.0
7	100.0
8	100.0
9	100.0
10	100.0
11	100.0
12	100.0
13	100.0
14	100.0
15	100.0
16	100.0
17	100.0
18	100.0
MAXIMUM	100.0
MINIMUM	100.0

				Species Composition of VOCs			
			Number of Formulations	Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Where Present	Low	High	Low	High
43000		Aliphatic HCs	11	58.00	100.00	73.00	100.00
43370	107-21-1	Ethylene Glycol	7	26.00	80.60	27.27	77.91
		Glycol Ethers and Ester Ethers	5	trace	18.40	trace	22.41
43304	67-63-0	Iso-propyl Alcohol	3	1.30	5.60	1.21	4.70
43802	75-09-2	Methylene Chloride	1	11.73		8.71	
		Miscellaneous	2	1.80	2.30	2.27	2.96
		Other Ketones and Esters	5	3.80	45.50	4.89	52.76
43369	57-55-6	Propylene Glycol	3	21.20	50.20	16.15	42.47
45202	108-88-3	Toluene	1	16.20		11.09	
43814	71-55-6	1,1,1-trichloroethane	1	2.07		.98	
45102	1330-20-7	Isomers of Xylene	4	1.30	10.20	.62	6.06

Table 3-1

PAINTS, PRIMERS, VARNISHES SUMMARY

(Continued)

NOTES TO TABLE

The following compounds may be in the compound groups listed in this table [43]:

Aliphatic Hydrocarbons: Lacquer diluents (boiling point 200 - 250°F), VM&P naphtha (b.p. 240 - 300°F), mineral spirits (b.p. 300 - 400°F)

Other Ketones and Esters: Texanol^{TM} ester alcohol; isobutyl isobutyrate; mixed dimethyl ester of glutaric, succinic and adipic acids; primary amyl acetate, 2-ethylhexyl acetate

Glycol Ethers and Ester Ethers: 2-(2-butoxyethoxy)-ethanol, butyl cellosolve, cellosolve acetate

Chlorinated Solvents: Methylene chloride, 1,1,1-trichloroethane

Miscellaneous: Cresols and cresylic acids, 1-nitropropane, turpentine, dimethylformamide, tetrahydrofuran, N-methyl-2-pyrrolidone. (Not all of these may be in architectural coatings.)

The "formulations" in this table are defined as follows:

1. Architectural coatings, interior, water-based, flat
2. Architectural coatings, interior, water-based, semi-gloss and gloss
3. Architectural coatings, interior, water-based, other
4. Architectural coatings, interior, oil-based, flat
5. Architectural coatings, interior, oil-based, semi-gloss and gloss
6. Architectural coatings, interior, oil-based, varnish
7. Architectural coatings, interior, oil-based, other
8. Architectural coatings, exterior, water-based, flat (house paints)
9. Architectural coatings, exterior, water-based, trim
10. Architectural coatings, exterior, water-based, stains
11. Architectural coatings, exterior, water-based, other
12. Architectural coatings, exterior, oil-based, flat (house paints)
13. Architectural coatings, exterior, oil-based, enamel
14. Architectural coatings, exterior, oil-based, primer
15. Architectural coatings, exterior, oil-based, varnish
16. Architectural coatings, exterior, oil-based, stains
17. Architectural coatings, exterior, oil-based, other
18. Aerosol paints

Table 3-2

HAIR SPRAY SUMMARY

Formulas	Pct. VOC by Wt.
1	97.0
2	97.0
3	96.0
4	96.0
5	96.0
6	96.0
7	97.0
8	97.0
9	90.8
10	97.0
11	96.0
12	96.0
13	95.0
14	95.0
15	99.9
16	93.9
17	96.0
18	98.0

Species Composition of VOCs

SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Range of Weight % When Present Low	Range of Weight % When Present High	Range of Volume % When Present Low	Range of Volume % When Present High
43823	75-71-8	Dichlorodifluoromethane	18	30.30	52.08	2.80	30.45
43802	75-09-2	Methylene Chloride	5	10.10	26.04	10.87	32.50
43453	84-66-2	Diethylphthalate	1	.11		.03	
		Essential Oil	8	.30	.32	.44	.66
43302	64-17-5	Ethyl Alcohol	18	4.17	92.55	9.59	94.19
43304	67-63-0	Iso-propyl Alcohol	2	7.45	29.63	5.81	45.49
43811	75-69-4	Trichlorofluoromethane	11	4.21	53.03	2.13	28.71

Table 3-3

ALL PURPOSE CLEANERS SUMMARY

Formula	Pct. VOC by Wt.
1-2	0.0
3	27.5
4-20	0.0
21-22	3.5
23	0.0
24	3.5
25-29	0.0
30-32	5.0
33-34	0.0
35	42.0
36	33.0
37	0.0
38	6.0
39-53	0.0
54	2.0
55	5.0
56-64	0.0
65-66	3.0
67	5.0
68-72	0.0
73	3.0
74	6.5
75	5.0
76	3.5
77-81	5.0
82	10.0
83	8.5
84	6.0
85	10.0
86-87	0.0
88	2.0
89-92	0.0
93-94	8.0
95	0.0
96-97	16.2
98	0.0
99-100	1.0
101-102	0.0
103	10.0
104	7.5
105	6.0
106	2.6
107-110	0.0
111	10.0
112-116	0.0
117	5.1
118	0.0
119	8.0
120	0.0
121	28.0
122-123	3.0
MAXIMUM	42
MINIMUM	0

				Species Composition oF VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Low	High	Low	High
43312	112-34-5	DEGBE	13	100.00		100.00	
43308	111-76-2	EGBE	15				
		EGME	1	100.00		100.00	
	141-43-5	Ethanolamine	1	100.00		100.00	
43304	67-63-0	Isopropanol	3				
	8008-20-6	Kerosene	3	17.86	90.91	32.71	90.91
	8032-32-4	Mineral Spirits	1	100.00		100.00	
		Perfume	7	0.00		0.00	
	8002-09-3	Pine Oil	8				
		PGBE	1	100.00		100.00	
43369	57-55-6	Propylene Glycol	5	10.71	100.00	10.89	100.00
43300	8000-41-7	Terpineol	4				
	8032-32-4	VM&P Naptha	1	71.43		56.40	

Table 3-4

INSECT SPRAYS SUMMARY

Formula	Pct.VOC by Wt.
1	86.50
2	100.00
3	99.32
4	99.15
5	98.95
6	99.83
7	98.55
8	0.00
9	99.91
10	55.50
MAXIMUM	100.00
MINIMUM	0.00

				Species Composition of VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Low	High	Low	High
43212	106-97-8	N-Butane	7	15.03	72.07	13.49	68.95
99919	62-73-7	DDVP	2	.20	20.00	.05	5.35
		Inert Ingredients	8	58.10	100.00	60.64	100.00
		Insecticide Solution in Kerosene	1	27.93		31.05	
43214	75-28-5	Isobutane	6	15.01	15.22	13.49	13.68
45101	8002-05-9	Petroleum Distillates	6	.40	11.85	.42	12.37
	8002-09-3	Pine Oil	1	.90		.35	

Table 3-5

CAR WAXES AND POLISHES SUMMARY

Formula	Pct. VOC by Wt.
1	10.50
2	22.50
3	0.00
4	35.50
5	32.90
6	2.00
7	23.28
8	.40
9	30.80
10	26.40
11	23.50
12	11.11
13	26.15
14	0.00
15	57.75
16	70.00
17	26.00
18	9.50
19	0.00
20	96.00
21	0.00
22	0.00
23	0.00
24	94.00

				Species Composition of VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Low	High	Low	High
43739	100-37-8	Diethylaminoethanol	1	4.76		2.09	
		Faxam 22	1	47.62		48.95	
43304	67-63-0	Iso-propyl Alcohol	4	.46	2.86	.38	2.39
43125	8008-20-6	Kerosene	8	.43	48.39	.43	49.06
43118	8032-32-4	Mineral Spirits	22	46.81	100.00	48.80	100.00
43742	110-91-8	Morpholine	10	2.60	100.00	1.51	100.00
		Solvent	1	100.00		100.00	
		Solvent L-140	1	100.00		97.61	
		Solvent L-410	1	100.00		100.00	

Table 3-6

ROOM DEODORANTS AND DISINFECTANTS

Formula	Pct. VOC by Wt.
1	87.0
2	95.0
3	51.5
4	35.5
MAXIMUM	95.0
MINIMUM	35.5

				Species Composition of VOCs			
			Number of Formulations	Range of Weight When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Where Present	Low	High	Low	High
43212	106-97-8	N-Butane	2	77.67	98.59	79.04	98.37
43302	64-17-5	Ethyl Alcohol	1	50.53		64.32	
43304	1330-20-7	Iso-propyl Alcohol	2	15.53	99.43	15.29	99.31
43802	75-09-2	Methylene Chloride	1	36.84		25.44	
		Perfume	4	.57	1.41	.69	1.63
43369	57-55-6	Propylene Glycol	2	5.83	11.37	4.53	8.76

Table 3-7

CAULKING AND SEALANT SUMMARY

Formula	Pct. VOC by Wt.
1	12.0
2	20.0
3	0.0
MAXIMUM	20
MINIMUM	0

Species Composition of VOCs

SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Range of Weight% When Present		Range of Volume % When Present	
				Low	High	Low	High
43304	67-63-0	Iso-propyl Alcohol		16.67		26.11	
45102	1330-20-7	Isomers of Xylene	2	83.33	100.00	73.89	100.00

Table 3-8

CONSUMER ADHESIVES SUMMARY

Formula	Pct.VOC by Wt.
1	3.00
2	0.00
3	0.00
4	12.00
5	80.00
6	85.00
7	59.40
MAXIMUM	85.00
MINIMUM	0.00

				Species Composition of VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Low	High	Low	High
43551	67-64-1	Acetone	1	12.94		13.84	
43436	628-63-7	Amyl Acetate	1	28.24		13.47	
43371	76-22-2	L-Camphor	1	7.06		2.88	
43300		Ethyl Alcohol 740 P	1	51.76		69.80	
43755	79-46-9	Nitropropane	1	5.05		4.88	
43000		Petroleum Oil	2	100.00		100.00	
43370	107-21-1	Ethylene Glycol	1	19.19		26.63	
45202	108-88-3	Toluene	2	72.39	100.00	67.70	100.00
45479	1330-78-5	Tricresyl Phosphate	1	3.37		.79	

Table 3-9

MOTH CONTROL PRODUCTS SUMMARY

Formula	Pct.VOC by Wt.
1	97.95
2	99.60
3	100.00
MAXIMUM	100.00
MINIMUM	97.95

				Species Composition of VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Low	High	Low	High
45807	106-46-7	P-Dichlorobenzene	1	100.00		100.00	
		Inert Ingredients	2	45.94	92.22	45.94	95.33
43100		Isoparaffinic HCs	1	7.78		4.67	
43000	8002-05-9	Petroleum Distillates	1	54.06		54.06	

Table 3-10

WINDOW AND GLASS CLEANERS SUMMARY

Formula	Pct. VOC by Wt.
1	12.5
2	10.0
3	8.0
4	13.6
5	47.5
6	12.8
7	12.6
8	12.6
9	12.6
10	9.0
11	7.0
12	18.0
13	0.0
14	0.0
15	0.0
16	0.0
MAXIMUM	47.5

				Species Composition of VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Low	High	Low	High
43212	106-97-8	N-Butane	2	19.32	22.47	21.01	22.85
43308	111-76-2	Butyl Cellosolve	5	11.11	39.68	5.98	12.75
43214	75-28-5	Isobutane	5	.75	39.68	.82	45.47
43304	67-63-0	Iso-propyl Alcohol	10	37.78	100.00	41.78	100.00
43301	65-56-1	Methyl Alcohol	2	100.00		100.00	
		Perfume	7	trace		trace	
43204	74-98-6	Propane	2	4.92	5.78	7.06	7.67

TABLE 3-11
HERBICIDES AND FUNGICIDES

Formula	Pct. VOC by Wt.
1	95.00
2	59.20
3	0.00
4	25.00
5	10.75
6	81.00
7	0.00
8	16.80
9	0.00
10	0.00
11	92.92
12	0.00
13	25.00
14	42.50
MAXIMUM	95.00

				Species Composition of VOCs			
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Range of Weight % When Present		Range of Volume % When Present	
				Low	High	Low	High
43000		Aliphatic Petroleum Distillates	1	89.61		94.82	
45000		Aromatic HCs(Primarily Xylenes)	1	100.00		100.00	
45000	68477-31-6	Aromatic Petroleum Solvent	2	50.00	100.00	39.05	100.00
45000	64742-94-5	Heavy Aromatic Naptha	2	50.00	100.00	60.95	100.00
		Inert Ingredients	1	100.00		100.00	
43000	8002-05-9	Petroleum Distillates	2	100.00		100.00	

Table 3-12

PERSONAL DEODORANT SUMMARY

Formula	Pct.VOC by Wt.
1	79.5
2	43.8
3	75.8
MAXIMUM	79.5
MINIMUM	43.8

				Species Composition of VOCs			
SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Range of Weight % When Present Low	High	Range of Volume % When present Low	High
43212	106-97-8	N-Butane	1	3.02		2.87	
43302	64-17-5	Ethyl Alcohol	1	1.06		1.10	
43214	75-28-5	Isobutane	2	77.23	98.94	75.87	98.90
43204	74-98-6	Propane	1	19.75		21.17	
43369	57-55-6	Propylene Glycol	1	100.00		100.00	

Table 3-13

AUTO ANTIFREEZE SUMMARY

Formula	Pct.VOC by Wt.
1	90.25
MINIMUM	90.25
MAXIMUM	90.25

				Species Composition of VOCs			
			Number of	Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Formulations Where Present	Low	High	Low	High
43370	107-21-1	Ethylene Glycol	1	95.01		97.02	
43373	111-46-6	Diethylene Glycol	1	4.99		2.98	

Table 3-14

CARBURETOR AND CHOKE CLEANERS SUMMARY

Formula	Pct.VOC by Wt.
1	88.20
2	100.00
3	67.50
4	90.00
5	75.30
MAXIMUM	100.00
MINIMUM	67.50

SAROAD CODE	CAS NUMBER	Compound	Number of Formulations Where Present	Species Composition of VOCs: Range of Weight % When Present: Low	Species Composition of VOCs: Range of Weight % When Present: High	Range of Volume % When Present: Low	Range of Volume % When Present: High
43551	67-64-1	Acetone	1	5.56		5.56	
43100		Aliphatic Hydrocarbons	1	88.00		83.18	
43212	106-97-8	N-Butane	3	12.00	24.00	16.82	39.29
45700		Complex Amines	1	.53		.78	
45605	1319-77-3	Cresol	3	15.80	35.00	15.68	25.31
45805	95-50-1	O-Dichlorobenzene	1	41.57		30.34	
43815	107-06-2	Ethylene Dichloride	2	30.00	63.00	23.70	59.26
43302	64-17-5	Ethyl Alcohol	1	14.47		27.61	
43301	67-56-1	Methyl Alcohol	1	11.11		26.94	
43802	75-09-2	Methylene Chloride	1	42.10		53.19	
43321	97-99-4	Tetrahydrofurfuryl Alcohol	1	11.11		8.45	
45202	108-88-3	Toluene	1	38.89		32.80	
45102	1330-20-7	Isomers of Xylene	1	33.33		24.39	

Table 3-15

BRAKE CLEANERS SUMMARY

Formula	Pct.VOC by Wt.
1	100.0
2	100.0
3	100.0
MINIMUM	100.0
MAXIMUM	100.0

				Species Composition of VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Low	High	Low	High
43302	64-17-5	Ethyl Alcohol	1	100.00		100.00	
43304	67-63-0	Iso-propyl Alcohol	1	100.00		100.00	
43301	67-56-1	Methyl Alcohol	1	100.00		100.00	

Table 3-16

ENGINE DEGREASERS SUMMARY

Formulas	Pct. VOC by Wt.
1	25.0
2	0.0
3	79.8
4	80.0
5	81.0
6	40.0
7	40.0
8	54.2
9	94.8
10	80.0
11	5.0
MAXIMUM	94.8
MINIMUM	0.0

				Species Composition of VOCs					
SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Low	Range of Weight % When Present	High	Low	Range of Volume % When Present	High
45000		Aromatic 150 Solvent	2		100.00			100.00	
43308	111-76-2	Butyl Cellosolve	3	25.00		100.00	12.36		100.00
43777	141-43-5	Ethanolamine	2		1.48			1.31	
45000	64742-94-5	Heavy Aromatic Naptha	1		100.00			100.00	
43304	67-63-0	Iso-propyl Alcohol	1		100.00			100.00	
43125	8008-20-6	Kerosene	4	59.04		100.00	77.95		100.00
43118	8032-32-4	Mineral Spirits	1		100.00			100.00	
43817	127-18-4	Perchloroethylene	1		9.28			3.04	
	8002-09-3	Pine Oil	1		37.27			18.06	

Table 3-17

ENGINE STARTING FLUID SUMMARY

Formula	Pct. VOC by Wt.
1	100.0
MAXIMUM	100.0
MINIMUM	100.0

				Species Composition of VOCs			
				Range Weight % When Present		Range of Volume % When Present	
SAROAD NUMBERS	CAS NUMBERS	Compound	Number of Formulations Where Present	Low	High	Low	High
43351	60-29-7	Ethyl Ether	1	100.00		100.00	

Table 3-18

RUG AND UPHOLSTERY CLEANERS SUMMARY

Formulas	Pct.VOC by Wt.
1	8.0
2	0.0
3	0.0
4	0.0
5	1.0
6	1.0
7	1.0
8	.9
9	9.1
10	1.0
11	0.0
12	1.0

				Species Composition of VOCs			
				Range of Weight % When Present		Range of Volume % When Present	
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Low	High	Low	High
43308	111-76-2	Butyl Cellosolve	11	1.23	100.00	9.79	100.00
43214	75-28-5	Isobutane	1	98.77		99.37	
43304	67-63-0	Iso-propyl Alcohol	3	82.42	100.00	90.21	100.00
		Perfume	6	trace		trace	

Table 3-19

LUBRICANTS AND SILICONES SUMMARY

Formula	Pct.VOC by Wt.
1	0.0
2	100.0
MAXIMUM	0.0
MINIMUM	0.0

				Species Composition of VOCs			
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Range of Weight % When Present Low	High	Range of Volume % When Present Low	High
		Colloidal Graphite Dispersion In Aliphatic Naphtha	1	5.00		5.74	
43400		Oxygenated Organic Acids	1	20.00		21.85	
43000	8030-30-6	Naphtha (aliphatic)	1	65.00		71.15	
45479	1330-78-5	Tricresyl Phosphate	1	10.00		1.49	
43411	3115-49-9	Nonylphenoxy Acetic Acid	1	trace		trace	

Table 3-20
METAL CLEANERS AND POLISHES SUMMARY

Formulas	Pct. VOC by Wt.
1	30.0
2	60.9
3	0.0
4	0.0
5	30.0
6	6.0
7	.9
8	25.0
9	5.0
10	5.0
11	22.0
12	2.0
13	25.0
14	36.0
15	0.0
16	0.0
17	.5
18	0.0
19	0.0
20	7.9
21	.1
22	.1
23	.1
24	5.0
MAXIMUM	60.9
MINIMUM	0.0

				Species Composition of VOCs					
SAROAD NUMBER	CAS NUMBER	Compound	Number of Formulations Where Present	Range of Weight % When Present Low		High	Range of Volume % When Present Low		High
45707	95-14-7	Benzotriazole	1		100.00			100.00	
43353	34590-94-8	DPGME	2		100.00			100.00	
43308	111-76-2	Butyl Cellosolve	1		100.00			100.00	
43302	64-17-5	Ethyl Alcohol	1		100.00			100.00	
43304	67-63-0	Iso-propyl Alcohol	1		98.73			99.50	
43125	8008-20-6	Kerosene	3	33.33		94.92	53.70		96.33
43301	67-56-1	Methyl Alcohol	1		100.00			100.00	
45478	99-76-3	Methyl p-Hydroxybenzoate	4	1.27		100.00	.50		100.00
43118	8032-32-4	Mineral Spirits	1		100.00			100.00	
		Perfume	2		trace			trace	
	8002-09-3	Pine Oil	2		9.00			100.00	
43369	57-55-6	Propylene Glycol	1		100.00			10.18	
43355	8000-41-7	Terpineol	2		91.00			89.94	
43909	68-11-1	Thioglycolic Acid	1		100.00			100.00	
43824	79-01-6	Trichloroethylene	1		9.09			3.62	
45101	8032-32-4	VM&P Naphtha	1		66.67			46.30	

3.2 COMPOSITE PROFILES

As was discussed in Section 2.6, composite species profiles could be developed for only a few of the consumer product subcategories. Tables 3-21 through 3-25 show the composite profiles for caulking and sealing compounds, window and glass cleaners, room deodorants and disinfectants, hair sprays, and engine starting fluids. All of the profiles were assigned data quality "E," which is defined as data "based on engineering calculations from one source; data set(s) based on engineering judgement; data set(s) with no documentation provided; may not be considered representative of the total population" [22].

Solvent use data were reported in Reference 11 for 17 types of architectural coatings and for aerosol coatings. These 18 data sets are, in effect, composite species profiles, since they are aggregated from data on all brands of each type of coating. The 18 formulation profiles presented in Appendix B for paints, primers and varnishes may therefore be considered to be composite species profiles. Tables 3-26 through 3-30 are summary composite profiles for the four main types of architectural coatings and for aerosol coatings.

Table 3-21

COMPOSITE VOC SPECIES PROFILE FOR CAULKING AND SEALING COMPOUNDS

PROFILE NAME: Caulking and sealing compounds

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE: Uncontrolled

REFERENCE (S): 17
DATA SOURCE: Composite profile based upon composition data from 3 formulations and the assumption that all formulations have the same market share.

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	6.25
45102	1330-20-7	ISOMERS OF XYLENE	106.16	93.75
			Total	100.00

Table 3-22

COMPOSITE VOC SPECIES PROFILE FOR WINDOW AND GLASS CLEANERS

PROFILE NAME: Window and Glass Cleaners

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE:Uncontrolled

REFERENCE (S): 13
DATA SOURCE: Composite profile based upon composition data from 16 formulations and the assumption that all formulations have the same market share.

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43204	74-98-6	PROPANE	44.09	0.80
43212	106-97-8	N-BUTANE	58.12	3.73
43214	75-28-5	ISO-BUTANE	58.12	8.63
43301	67-56-1	METHYL ALCOHOL	32.04	14.19
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	66.70
43308	111-76-2	BUTYL CELLOSOLVE	118.17	5.94
-----	--------	PERFUME	50.00	0.01
			Total	100.00

Table 3-23

COMPOSITE VOC SPECIES PROFILE FOR ROOM DEODORANTS AND DISINFECTANTS

PROFILE NAME: Room Deodorants and Disinfectants

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE: Uncontrolled

REFERENCE (S): 14
DATA SOURCE: Composite profile based upon composition data from 4 formulations and the assumption that all formulations have the same market share.

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43212	106-97-8	N-BUTANE	58.12	15.06
43302	64-17-5	ETHYL ALCOHOL	46.07	17.85
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	35.09
43369	57-55-6	PROPYLENE GLYCOL	76.00	5.13
43802	75-09-2	METHYLENE CHLORIDE	84.93	13.01
-----	--------	PERFUME	50.00	13.86
			Total	100.00

Table 3-24
COMPOSITE VOC SPECIES PROFILE FOR HAIR SPRAYS

PROFILE NAME: Hair Sprays

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE:Uncontrolled

REFERENCE (S): 12
DATA SOURCE: Composite profile based upon composition data from 19 formulations and the assumption that all formulations have the same market share.

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43302	64-17-5	ETHYL ALCOHOL	46.07	39.40
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	1.94
43453	84-66-2	DIETHYLPHTHALATE	222.20	0.01
43802	75-09-2	METHYLENE CHLORIDE	84.93	4.18
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.38	16.86
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	37.48
-----	-------	ESSENTIAL OIL	50.00	0.13
			Total	100.00

Table 3-25
COMPOSITE VOC SPECIES PROFILE FOR ENGINE STARTING FLUIDS

PROFILE NAME: Engine Starting Fluid

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE: Uncontrolled

REFERENCE (S): 17
DATA SOURCE: Composite profile based upon composition data from 1 formulation.

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43351	60-29-7	ETHYL ETHER	74.12	100.00
			Total	100.00

Table 3-26

COMPOSITE VOC SPECIES PROFILE FOR INTERIOR WATER-BASED ARCHITECTURAL COATINGS

PROFILE NAME: INTERIOR WATER-BASED ARCHITECTURAL COATINGS

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE:Uncontrolled

REFERENCE (S): 11, 43
DATA SOURCE: National consumption of solvents in paints and coatings of this type, as inventoried for the National Paint and Coatings Association Data Bank Program

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43369	57-55-6	PROPYLENE GLYCOL	76.00	40.05
43370	107-21-1	ETHYLENE GLYCOL	62.07	39.51
-----	--------	GLYCOL ETHERS AND GLYCOL ETHER ESTERS		16.19
-----	--------	OTHER KETONES AND ESTERS		2.19
-----	--------	MISCELLANEOUS		2.06
			Total	100.00

Table 3-27

COMPOSITE VOC SPECIES PROFILE FOR INTERIOR SOLVENT-BASED ARCHITECTURAL COATINGS

PROFILE NAME: INTERIOR SOLVENT-BASED ARCHITECTURAL COATINGS

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE:Uncontrolled

REFERENCE (S): 11, 43
DATA SOURCE: National consumption of solvents in paints and coatings of this type, as inventoried for the National Paint and Coatings Association Data Bank Program

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43000	-----------	ALIPHATIC HYDROCARBONS	86.17	98.08
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	.96
45102	1330-20-7	ISOMERS OF XYLENE	106.16	.96
			Total	100.00

Table 3-28

COMPOSITE VOC SPECIES PROFILE FOR EXTERIOR WATER-BASED ARCHITECTURAL COATINGS

PROFILE NAME: EXTERIOR WATER-BASED ARCHITECTURAL COATINGS

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE:Uncontrolled

REFERENCE (S): 11, 43
DATA SOURCE: National consumption of solvents in paints and coatings of this type, as inventoried for the National Paint and Coatings Association Data Bank Program

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	1.00
43369	57-55-6	PROPYLENE GLYCOL	76.00	1.16
43370	107-21-1	ETHYLENE GLYCOL	62.07	56.29
-----	--------	OTHER KETONES AND ESTERS		41.55
			Total	100.00

Table 3-29

COMPOSITE VOC SPECIES PROFILE FOR EXTERIOR SOLVENT-BASED ARCHITECTURAL COATINGS

PROFILE NAME: EXTERIOR SOLVENT-BASED ARCHITECTURAL COATINGS

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE: Uncontrolled

REFERENCE (S): 11, 43
DATA SOURCE: National consumption of solvents in paints and coatings of this type, as inventoried for the National Paint and Coatings Association Data Bank Program

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43000	-----------	ALIPHATIC HYDROCARBONS	86.17	99.43
45102	1330-20-7	ISOMERS OF XYLENE	106.16	.57
			Total	100.00

Table 3-30
COMPOSITE VOC SPECIES PROFILE FOR AEROSOL COATINGS

PROFILE NAME: AEROSOL COATINGS

PROFILE NUMBER:
PROFILE DATA QUALITY: E

CONTROL DEVICE:Uncontrolled

REFERENCE (S): 11, 43
DATA SOURCE: National consumption of solvents in paints and coatings of this type, as inventoried for the National Paint and Coatings Association Data Bank Program

SCC:

SAROAD Number	CAS Number	Species Name	Mol. Weight	Percent Weight
43000	-----------	ALIPHATIC HYDROCARBONS	86.17	57.77
45102	1330-20-7	ISOMERS OF XYLENE	106.16	10.27
45202	108-88-3	TOLUENE	92.13	16.21
-----	-----------	CHLORINATED SOLVENTS		15.75
			Total	100.00

An attempt was made to develop composite species profiles from composition data reported by Gosselin et al. [17] and market share data reported by the Simmons Market Research Bureau [19, 22, 23]. However, the product composition data were not sufficiently detailed for this purpose.

SECTION 4
METHODS FOR STATE AND LOCAL AGENCIES

4.1 INVENTORY OF TOTAL VOC

4.1.1 National Consumption

Use data for the consumer product categories were obtained from several sources, including the following:

- **Pressurized Products Survey, United States** [16]. The Chemical Manufacturers Association, Inc. conducts an annual survey of container manufacturers, valve manufacturers, and companies with filling lines. The survey for 1984 included responses from 217 container fillers, representing about 88 percent of the industry. The report on the survey shows numbers of units filled for a wide variety of consumer product subcategories.

- **Simmons Study of Media and Markets** [19, 22, 23]. The Simmons Market Research Bureau carries out annual surveys of product use. Representative surveys of adults (age 18 years and over) living in the conterminous 48 States are conducted to determine use patterns for a wide variety of consumer product subcategories.

- **Analysis of Pressurized Products Relative to Hydrocarbon Propellants and Other Volatile Organic Compounds** [15]. The Western Aerosol Information Bureau (WAIB) is the only source of comprehensive information on aerosol product unit size. For several of the consumer product subcategories, quantities used were calculated by multiplying the number of units filled (from Reference 16) by the unit size reported by the WAIB.

- **Consumer Pesticides and Fertilizers** [24]. This report presents use estimates which are based upon interviews with about 180 suppliers, distributors, and government agencies; a review of the published literature; price lists; product descriptions; and other information. This is probably the most accurate source for usage data.

- **Household Cleansing Products** [25]. This report contains use data based upon telephone interviews with 38 major suppliers, and with distributors and government agencies.

Consumer product use data from these sources were presented by Jones et al. [1]. For the present investigation, we conducted on-line searches of several data bases, in order to obtain more recent information. Data bases included:

- CENDATA
- Predicasts F&S Index
- Predicasts Forecasts
- Predicasts Marketing and Advertising Reference Service (MARS)
- Predicasts Overview of Markets and Technology (PROMT)
- Predicasts U.S. Time Series

With only a few exceptions, more recent use data were not readily available. We therefore adjusted the use values reported by Jones et al. [1] to reflect growth or decline between the year for which the data were originally reported and 1986.

Use adjustments were made in several ways. One was to use historic growth rates in sales, and to assume that quantities used are proportional to sales. For example, room deodorant sales rose by 13.3 percent from 1983 (the base year for the use rate reported in Reference 1) to 1984 and were projected to increase by another 9.3 percent in 1985 [26]. As no data on growth between 1985 and 1986 were available, we assumed that the 1984-1985 growth rate would apply. The overall escalation rate would then be:

$$\text{Growth} = (1.133)(1.093)(1.093) = 1.35$$

Use of room deodorants in 1983 was estimated to be 132.75 million lbs. The 1986 value would therefore be (1.35)(132.75) = 179.2 million lb.

For most of the consumer product subcategories, sales data were unavailable. We therefore used a surrogate measure of growth, national production of nondurable consumer goods. According to the Predicasts U.S. Time

Series Data Base [27], the index of nondurable consumer goods production in 1980-1985, where production in 1977 equals 100, was:

Year	Index
1980	108.1
1981	109.3
1982	108.3
1983	113.3
1984	120.1
1985	122.9

No index for 1986 was reported. We assumed that the 1984-1985 growth rate (2.33 percent) applied to 1985-1986, except where other data were available. For example, retail sales of antifreeze grew by 7.6 percent from 1985 to 1986 [28]; for the auto antifreezes subcategory, therefore, the 1985 index was changed to 132.2. For other subcategories, the index value for 1986 (I_{1986}) was estimated to be 125.8. Use in 1986 (U_{1986}) was projected from base year use (U_{base}) by:

$$U_{1986} = \bar{U}_{base} \frac{I_{1986}}{I_{base}}$$

where I_{base} is the consumer nondurables production index for the base year.

The only consumer product subcategory for which 1986 use data were directly available was adhesives. According to a market research report summarized by PTS [29], "consumer use" of "household adhesives" was 44 million lbs in 1986. It should be noted that the definition of "consumer use" was not stated. Indeed, the whole issue of apportioning total adhesive use among consumer and non-consumer applications is quite problematic. This issue is discussed further in Section 5.

Table 4-1 shows the updated national use estimates, along with the assumed growth rates and the references for the data.

Table 4-1
UPDATE OF CONSUMER PRODUCT USE ESTIMATES TO 1986

Consumer Product Subcategory	Base Use (1000 lb)	Base Year	Information Source	Growth Rate	Info. Source	1986 Use (1000 lb)
Paints, Primers, Varnishes	651,000	1985	Ref. 11	1.00		651,000
Hair Sprays	170,541	1984	Refs. 15, 16	1.05	Ref. 27	178,635
All Purpose Cleaners	512,000	1982	Ref. 25	1.16	Ref. 27	594,733
Insect Sprays	192,500	1982	Ref. 25	1.16	Ref. 27	223,606
Car Polishes and Waxes	189,100	1983	Ref. 22, Shelf survey	1.11	Ref. 27	209,963
Room Deodorants and Disinfectants	132,750	1983	Ref. 22	1.35	Ref. 26	179,212
Caulking and Sealing Compounds	432,800	1984	U.S.Bureau	1.05	Ref. 27	453,341
Adhesives (consumer)	44,000	1986	Ref. 29			44,000
Moth Control Products	39,000	1982	Ref. 18	1.16	Ref. 27	45,302
Window and Glass Cleaners	174,000	1982	Ref. 18	1.16	Ref. 27	202,116
Herbicides, Fungicides	69,000	1981	Ref. 24	1.15	Ref. 27	79,416
Personal Deodorants	39,000	1984	Refs. 15, 16	1.05	Ref. 27	40,851
Auto Antifreeze	22,300	1983	Ref. 16	1.17	Ref. 28	26,020
Carburetor and Choke Cleaners	29,850	1984	Refs. 15, 16	1.05	Ref. 27	31,267
Brake Cleaners	18,758	1984	Refs. 15, 16	1.05	Ref. 27	19,648
Engine Degreasers	20,912	1984	Refs. 15, 16	1.05	Ref. 27	21,905
Engine Starting Fluids	17,248	1984	Refs. 15, 16	1.05	Ref. 27	18,067
Rug and Upholstery Cleaners	115,000	1982	Ref. 25	1.16	Ref. 27	133,583
Lubricants and Silicones	33,176	1984	Refs. 15, 16	1.05	Ref. 27	34,751
Metal Cleaners and Polishes	24,000	1982	Ref. 25	1.16	Ref. 27	27,878
Totals	2,926,936					3,215,293

National VOC emissions from the use of the consumer products investigated may be estimated by multiplying consumption rates by the fraction of VOC in the products. For example, 202 million lb of window and glass cleaners are estimated to have been used in 1986. According to the species profile presented in Table 3-10, VOC compounds constitute from 0 to 47.5 percent by weight of these products; the midpoint VOC content is 23.8 percent. Thus, national VOC emissions would be (0.238)(202,000,000 lb) = 48.1 million lb. Table 4-2 presents our latest estimates of national emissions of total VOC, by consumer product subcategory, for 1986. Note that the "midpoint" values **are simply an average of the low and high estimates, and should not be considered as statistical averages or medians.**

4.1.2 Apportionment by States

As noted in Section 2.2.3, the geographic distribution of consumer product use and associated VOC emissions depends upon both population and a measure of regional consumer preference. These measures were combined to yield a "population-weighted preference." Let P_i be the population of a region and I_i be a preference index, as reported by the Simmons Market Research Bureau. The weighted preference for the ith region is then defined as:

$$WP_i = \frac{P_i I_i}{\sum_i P_i I_i} \qquad (4\text{-}1)$$

Consumption within a region (C_i) may be found by multiplying the weighted preference by the national consumption rate:

$$C_i = C\, WP_i \qquad (4\text{-}2)$$

where C is the national consumption rate. Per capita consumption in a given region is then found by dividing regional consumption by regional population:

Table 4-2
NATIONAL VOC EMISSIONS BY CONSUMER PRODUCT SUBCATEGORY, 1986

Consumer Product Subcategory	VOC Emissions (1000 lb) Low	Midpoint	High
Paints, Primers, Varnishes	651,000	651,000	651,000
Hair Sprays	151,952	190,976	230,000
All Purpose Cleaners	0	124,894	249,788
Insect Sprays	0	111,803	223,606
Car Polishes and Waxes	0	100,782	201,564
Room Deodorants and Disinfectants	52,326	99,861	147,396
Caulking and Sealing Compounds	0	45,334	90,668
Adhesives (consumer)	0	18,700	37,400
Moth Control Products	43,490	44,305	45,121
Window and Glass Cleaners	0	48,003	96,005
Herbicides, Fungicides	0	37,723	75,445
Personal Deodorants	17,893	25,185	32,477
Auto Antifreeze	23,483	23,483	23,483
Carburetor and Choke Cleaners	21,105	26,186	31,267
Brake Cleaners	19,648	19,648	19,648
Engine Degreasers	0	10,383	20,766
Engine Starting Fluids	18,067	18,067	18,067
Rug and Upholstery Cleaners	0	6,078	12,156
Lubricants and Silicones	0	17,375	34,751
Metal Cleaners and Polishes	0	8,489	16,978
Totals	998,963	1,628,274	2,257,585

$$PCC_i = \frac{C\ WP_i}{P_i} \qquad (4\text{-}3)$$

Continuing with the example of window and glass cleaners, the preference indexes, populations, and weighted preferences for the marketing regions defined by Simmons are:

Region	Population	Preference Index	Weighted Preference
Northeast	50,019,000	108	0.225
North Central	59,316,000	105	0.259
South	82,985,000	95	0.328
West	48,758,000	93	0.189
Total	241,078,000		

Consumption and per-capita consumption for the four regions are:

Region	Consumption (Million lb)	Per Capita Consumption (lb)
Northeast	45.4	0.908
North Central	52.3	0.882
South	66.3	0.798
West	38.1	0.782

Finally, total VOC emissions and per capita emissions are calculated by multiplying the VOC fraction times the consumption and the per-capita consumption, respectively. Continuing with the window and glass cleaner example, emissions would be 23.8 percent of consumption:

Region	Emissions (tons)	Per Capita Emissions (lb)
Northeast	5,403	0.216
North Central	6,229	0.210
South	7,885	0.190
West	4,535	0.186

Table 4-3 shows the states comprising each region. For lack of state-specific data on consumer preferences, we assume that the regional values reported here apply to each state in a given region. Table 4-4 shows our estimates of per-capita consumption and per-capita emissions from use of each consumer product subcategory in each region.

Table 4-5 presents total per-capita emissions for the 20 consumer product subcategories, by region. These may be used by a State or local air pollution agency to estimate emissions in a particular county:

County emissions = (County population)(per-capita emissions)

For example, let us estimate emissions of window and glass cleaners in Santa Barbara County, California. The projected 1985 population for this county was 192,763 [30]. From Table 4-3, we see that California is in the "Pacific" region. From Table 4-4, per-capita VOC emissions from window and glass cleaners in that region range from 0 to 0.371 lb, with a midpoint of 0.186 lb. Thus emissions in the county would be:

Low: 0 lb
Midpoint: (0.186 lb/person)(192,763 persons) = 35,854 lb
High: (0.371 lb/person)(192,763 persons) = 71,515 lb

As noted in Section 2.1, the 20 consumer product subcategories investigated accounted for 90 percent of the PROC emissions reported by Jones et al. [1]. Because the present study also included non-photochemically reactive organic compounds, such as 1,1,1-trichloroethane, it is not know whether the 20 subcategories also account for 90 percent of all VOC emissions from consumer and commercial product use. The values in Table 4-5 therefore underrepresent the real per-capita emissions from these sources, but the magnitude of the underrepresentation is unknown.

Table 4-3
DEFINITION OF MARKETING REGIONS

EAST	NORTH CENTRAL	SOUTH	WEST
New England	**East North Central**	**South Atlantic**	**Mountain**
Connecticut	Illinois	Delaware	Arizona
Maine	Indiana	District of Columbia	Colorado
Massachusetts	Michigan	Florida	Idaho
New Hampshire	Ohio	Georgia	Montana
Rhode Island	Wisconsin	Maryland	Nevada
Vermont		North Carolina	New Mexico
	West North Central	South Carolina	Utah
Middle Atlantic		Virginia	Wyoming
	Iowa	West Virginia	
New York	Kansas		**Pacific**
New Jersey	Minnesota	**East South Central**	
Pennsylvania	Missouri		Alaska
	Nebraska	Alabama	California
	North Dakota	Kentucky	Hawaii
	South Dakota	Mississippi	Oregon
		Tennessee	Washington
		West South Central	
		Arkansas	
		Louisiana	
		Oklahoma	
		Texas	

Table 4-4

PER-CAPITA CONSUMPTION AND VOC EMISSIONS BY MARKETING REGION AND CONSUMER PRODUCT SUB-CATEGORY

	PAINTS, PRIMERS. VARNISHES				HAIR SPRAY				ALL PURPOSE CLEANERS			
		PER-CAPITA VOC EMISSIONS (LB)				PER-CAPITA VOC EMISSIONS (LB)				PER-CAPITA VOC EMISSIONS (LB)		
MARKETING REGION	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH
New England	2.700	2.700	2.700	2.700	.599	.396	.497	.599	2.910	0.000	.611	1.222
Middle Atlantic	2.700	2.700	2.700	2.700	.599	.396	.497	.599	2.910	0.000	.611	1.222
East North Central	2.700	2.700	2.700	2.700	.688	.454	.571	.688	2.294	0.000	.482	.963
West North Central	2.700	2.700	2.700	2.700	.688	.454	.571	.688	2.294	0.000	.482	.963
South Atlantic	2.700	2.700	2.700	2.700	.947	.625	.786	.946	2.614	0.000	.549	1.098
East South Central	2.700	2.700	2.700	2.700	.947	.625	.786	.946	2.614	0.000	.549	1.098
West South Central	2.700	2.700	2.700	2.700	.947	.625	.786	.946	2.614	0.000	.549	1.098
Mountain	2.700	2.700	2.700	2.700	.599	.396	.497	.599	1.973	0.000	.414	.829
Pacific	2.700	2.700	2.700	2.700	.599	.396	.497	.599	1.973	0.000	.414	.829

Table 4-4 (Cont.)

MARKETING REGION	INSECT SPRAYS				CAR WAXES AND POLISHES				ROOM DEODORANTS AND DISINFECTANTS			
		PER-CAPITA VOC EMISSIONS (LB)				PER-CAPITA VOC EMISSIONS (LB)				PER-CAPITA VOC EMISSIONS (LB)		
	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH
New England	.815	.041	.428	.815	.845	0.000	.406	.811	.742	.263	.503	.742
Middle Atlantic	.815	.041	.428	.815	.845	0.000	.406	.811	.742	.263	.503	.742
East North Central	.769	.038	.404	.769	.924	0.000	.443	.887	.720	.256	.488	.720
West North Central	.769	.038	.404	.769	.924	0.000	.443	.887	.720	.256	.488	.720
South Atlantic	1.186	.059	.622	1.186	.854	0.000	.410	.820	.831	.295	.563	.831
East South Central	1.186	.059	.622	1.186	.854	0.000	.410	.820	.831	.295	.563	.831
West South Central	1.186	.059	.622	1.186	.854	0.000	.410	.820	.831	.295	.563	.831
Mountain	.797	.040	.418	.797	.863	0.000	.414	.828	.623	.221	.422	.623
Pacific	.797	.040	.418	.797	.863	0.000	.414	.828	.623	.221	.422	.623

Table 4-4 (Cont.)

MARKETING REGION	CAULKING AND SEALING COMPOUNDS				ADHESIVES				MOTH CONTROL PRODUCTS			
	PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)			PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)			PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)		
		LOW	MID POINT	HIGH		LOW	MID POINT	HIGH		LOW	MID POINT	HIGH
New England	1.880	0.000	.188	.376	.186	0.000	.079	.158	.188	.180	.184	.188
Middle Atlantic	1.880	0.000	.188	.376	.186	0.000	.079	.158	.188	.180	.184	.188
East North Central	1.880	0.000	.188	.376	.195	0.000	.083	.166	.188	.180	.184	.188
West North Central	1.880	0.000	.188	.376	.195	0.000	.083	.166	.188	.180	.184	.188
South Atlantic	1.880	0.000	.188	.376	.166	0.000	.070	.141	.188	.180	.184	.188
East South Central	1.880	0.000	.188	.376	.166	0.000	.070	.141	.188	.180	.184	.188
West South Central	1.880	0.000	.188	.376	.166	0.000	.070	.141	.188	.180	.184	.188
Mountain	1.880	0.000	.188	.376	.193	0.000	.082	.164	.188	.180	.184	.188
Pacific	1.880	0.000	.188	.376	.193	0.000	.082	.164	.188	.180	.184	.188

Table 4-4 (Cont.)

MARKETING REGION	WINDOW AND GLASS CLEANER				HERBICIDES AND FUNGICIDES				PERSONAL DEODORANTS			
	PER-CAPITA CONSUMPTION	PER CAPITA VOC EMISSIONS (LB)			PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)			PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)		
		LOW	MID POINT	HIGH		LOW	MID POINT	HIGH		LOW	MID POINT	HIGH
New England	.908	0.000	.216	.431	.329	0.000	.156	.313	.169	.074	.104	.135
Middle Atlantic	.908	0.000	.216	.431	.329	0.000	.156	.313	.169	.074	.104	.135
East North Central	.882	0.000	.210	.419	.329	0.000	.156	.313	.166	.073	.102	.132
West North Central	.882	0.000	.210	.419	.329	0.000	.156	.313	.166	.073	.102	.132
South Atlantic	.798	0.000	.190	.379	.329	0.000	.156	.313	.179	.079	.111	.143
East South Central	.798	0.000	.190	.379	.329	0.000	.156	.313	.179	.079	.111	.143
West South Central	.798	0.000	.190	.379	.329	0.000	.156	.313	.179	.079	.111	.143
Mountain	.782	0.000	.186	.371	.329	0.000	.156	.313	.157	.069	.097	.125
Pacific	.782	0.000	.186	.371	.329	0.000	.156	.313	.157	.069	.097	.125

Table 4-4 (Cont.)

	AUTO ANTIFREEZE				CARBURETOR AND CHOKE CLEANERS				BRAKE CLEANERS			
		PER-CAPITA VOC EMISSIONS (LB)				PER-CAPITA VOC EMISSIONS (LB)				PER-CAPITA VOC EMISSIONS (LB)		
MARKETING REGION	PER-CAPITA CONSUMPTION	LOW	POINT	HIGH	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH	PER-CAPITA CONSUMPTION	LOW	POINT	HIGH
New England	.092	.083	.083	.083	.130	.088	.109	.130	.082	.082	.082	.082
Middle Atlantic	.092	.083	.083	.083	.130	.088	.109	.130	.082	.082	.082	.082
East North Central	.129	.116	.116	.116	.130	.088	.109	.130	.082	.082	.082	.082
West North Central	.129	.116	.116	.116	.130	.088	.109	.130	.082	.082	.082	.082
South Atlantic	.108	.097	.097	.097	.130	.088	.109	.130	.082	.082	.082	.082
East South Central	.108	.097	.097	.097	.130	.088	.109	.130	.082	.082	.082	.082
West South Central	.108	.097	.097	.097	.130	.088	.109	.130	.082	.082	.082	.082
Mountain	.099	.090	.090	.090	.130	.088	.109	.130	.082	.082	.082	.082
Pacific	.099	.090	.090	.090	.130	.088	.109	.130	.082	.082	.082	.082

Table 4-4 (Cont.)

MARKETING REGION	ENGINE DEGREASERS				ENGINE STARTING FLUID				RUG AND UPHOLSTERY CLEANERS			
	PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)			PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)			PER-CAPITA CONSUMPTION	PER-CAPITA VOC EMISSIONS (LB)		
		LOW	MID POINT	HIGH		LOW	MID POINT	HIGH		LOW	MID POINT	HIGH
New England	.091	0.000	.043	.086	.075	.075	.075	.075	.619	0.000	.028	.056
Middle Atlantic	.091	0.000	.043	.086	.075	.075	.075	.075	.619	0.000	.028	.056
East North Central	.091	0.000	.043	.086	.075	.075	.075	.075	.531	0.000	.024	.048
West North Central	.091	0.000	.043	.086	.075	.075	.075	.075	.531	0.000	.024	.048
South Atlantic	.091	0.000	.043	.086	.075	.075	.075	.075	.558	0.000	.025	.051
East South Central	.091	0.000	.043	.086	.075	.075	.075	.075	.558	0.000	.025	.051
West South Central	.091	0.000	.043	.086	.075	.075	.075	.075	.558	0.000	.025	.051
Mountain	.091	0.000	.043	.086	.075	.075	.075	.075	.509	0.000	.023	.046
Pacific	.091	0.000	.043	.086	.075	.075	.075	.075	.509	0.000	.023	.046

Table 4-4 (Cont.)

MARKETING REGION	LUBRICANTS AND SILICONES				METAL CLEANERS AND POLISHES			
		PER-CAPITA VOC EMISSIONS (LB)				PER-CAPITA VOC EMISSIONS (LB)		
	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH	PER-CAPITA CONSUMPTION	LOW	MID POINT	HIGH
New England	.144	0.000	.072	.144	.116	0.000	.035	.070
Middle Atlantic	.144	0.000	.072	.144	.116	0.000	.035	.070
East North Central	.144	0.000	.072	.144	.116	0.000	.035	.070
West North Central	.144	0.000	.072	.144	.116	0.000	.035	.070
South Atlantic	.144	0.000	.072	.144	.116	0.000	.035	.070
East South Central	.144	0.000	.072	.144	.116	0.000	.035	.070
West South Central	.144	0.000	.072	.144	.116	0.000	.035	.070
Mountain	.144	0.000	.072	.144	.116	0.000	.035	.070
Pacific	.144	0.000	.072	.144	.116	0.000	.035	.070

Table 4-5

TOTAL PER-CAPITA CONSUMER PRODUCT EMISSIONS, BY MARKETING REGION[a]

Marketing Region	Per-Capita Emissions (lb/yr) Low	High	Midpoint
New England	4.0	9.2	6.6
Middle Atlantic	4.0	9.2	6.6
East North Central	4.1	9.1	6.6
West North Central	4.1	9.1	6.6
South Atlantic	4.3	9.9	7.1
East South Central	4.3	9.9	7.1
West South Central	4.3	9.9	7.1
Mountain	3.9	8.6	6.3
Pacific	3.9	8.6	6.3
National Average	4.1	9.3	6.7

[a] Because only 20 of 47 consumer product subcategories were investigated, the values reported here may understate actual per-capita emission factors.

4.2 INVENTORY BY SPECIES

Estimating emissions of individual species from consumer product use is quite problematic at this point, given the lack of market share data. The only cases in which it is feasible is where composite species profiles, such as the ones presented in Section 2.6, are available. Even then, the simplifying assumptions upon which these profiles are based must be recognized.

To estimate species-specific emissions, one multiplies the total VOC emissions by the fraction of total VOC represented by each species. As an example, consider emissions from hair sprays in Santa Barbara County, California. Per-capita VOC emissions from hair spray use (see Table 4-4) range from 0.40 to 0.60 lb in the region. Given the composite species profile presented in Section 2.6 and the population presented in Section 4.1.2, and using the midpoint of 0.50 lb per capita VOC emissions, we obtain the following estimates of species emissions:

Compound	Weight Pct VOC	Pounds Per Capita	Emissions (lb)
Dichlorodifluoromethane	37.48	0.187	36,100
Diethylphthalate	0.01	0.00005	10
Essential oil	0.13	0.00065	125
Ethyl alcohol	39.40	0.197	38,000
Iso-propyl alcohol	1.74	0.0087	1,680
Methylene chloride	4.18	0.021	4,030
Trichlorofluoromethane	16.86	0.0843	16,250

SECTION 5
ISSUES AND CONCERNS

As with all emission factor estimates, the results presented in this report must be used with caution. Given the enormous variety of consumer products, and the general scarcity of data on their composition and use, the emission factors and species profiles presented here are subject to considerable uncertainty. The purpose of this section is to highlight some of the major areas where more information is needed.

5.1 COMPOSITION DATA

5.1.1 Formulation Data

The accuracy of the formulation data presented in this report is difficult to assess. Neither of the two main sources of formulation data provides sufficient information for a rigorous calculation of speciated VOC emissions. The compilations by Flick [12, 13] are intended for use by industry personnel and by raw material suppliers (to identify markets for their products); while they present very detailed, compound-specific information, they do not include brand or trade names for the formulations. This is a serious omission because, even if market share data were readily available, one could not associate the formulations with the brand names. Gosselin et al. [17], on the other hand, provide brand and trade names, but often reports only chemical classes (e.g. "aromatic petroleum solvent") rather than specific species. For many products, Gosselin et al. merely list the species, omitting percentages by weight or volume.

Products are continually changing to accommodate changes in materials costs, demand, competition, and government regulations; thus published formulation data quickly become obsolete. The degree to which the information cited is inaccurate is difficult to judge. We do suspect, however, that the use (and emissions) of chlorofluorocarbons is probably less than that reported here. For example, according to a recent California Air Resources Board-sponsored study, these compounds are not in the hair sprays sold in California [46].

5.1.2 Composite Species Profiles

Given the lack of information on the relative importance of each formulation within each consumer product subcategory, it is difficult to obtain meaningful composite species profiles. Only in those few cases where the formulations are very similar can an approximation to a composite profile be obtained. Because product compositions and their markets change so frequently, it is probably not worthwhile to develop composite profiles for indefinite use by all State and local agencies. Alternative remedies to the problem are discussed in Section 5.4.

5.2 USE DATA

The most accurate and timely information on use of consumer products comes from market research surveys. Recent survey reports cost from $5,000 to $10,000 and cover only one or two consumer product subcategories. Publicly available market research reports are likely to be several years old and thus out of date.

An extensive search of online data bases found very little information on **quantities** of consumer product use, although **sales** data (in dollars) are generally more available. In principle, sales could be translated into quantities if unit price data could be obtained. Obtaining that information was, however, outside the scope of this investigation.

A consumer product category which is particularly difficult to characterize is adhesives. Although the Census Bureau's Census of Manufacturers and Survey of Manufacturers report production and sales of adhesives, the data reported by the Bureau has been likened to "the tip of an iceberg" [31]. In actuality, the industry is defined by the user, rather than by the supplier, and many uses are not accounted for in most statistical studies. In fact, estimates of the actual use of adhesives ranges from as little as 20 percent of the officially reported figures to several times those published by the Census Bureau [31].

Furthermore, it is difficult to determine the fraction of total adhesives use which may be attributable to consumers. One published estimate [32] puts consumer use as 5 percent of the total. A more recent analysis [33] defined the consumer market as "all adhesives sold through do-it-yourself supply channels, hobby and model shop supply channels and stationery, school and office supply channels," and estimates consumer use as about 5 to 6 percent of the total. Using other data from the same reference leads to an estimate of consumer use of about 194 million pounds per year. However, the PTS U.S. Time Series data base shows only 44 million lb/year of use of consumer adhesives by households [29].

5.3 PER-CAPITA VOC EMISSION FACTORS

For estimating national VOC emissions from consumer product use, the methods presented in Section 4.1 are, in our judgment, as accurate as possible, given the quality of the available data. Because only 20 of 47 possible consumer product subcategories were examined, the results presented here must be "scaled up" to obtain total national per-capita VOC emissions. As was discussed in Section 2.1, the 20 categories represented 90 percent of the photochemically reactive organic compound emissions from consumer and commercial product use in California, as determined by Jones et al. [1]. The choice of these 20 for further study might have led to a slight bias in favor of those products whose VOC constituents are photochemically reactive. However, for 15 of the 20 subcategories, the VOC species reported by Jones et al. were all photochemically reactive, and none of the 27 omitted subcategories had such significant non-PROC emissions that they would have been included in the final 20 if total VOC had been the selection criterion. It is therefore probably valid to scale up the results of the present study by a factor of 1/0.9 to obtain national totals.

Our new estimates of per-capita VOC emission factors appear to be reasonable. For the consumer product subcategories examined, the national average value (weighted by population) ranges from 4.1 to 9.3, with a midpoint of 6.7 lb/person/year. The scaled-up midpoint would be about 7.4. This may be compared with EPA's suggested emission factor of 6.3 lb/person per year for "commercial/consumer" solvent use [34]. This value includes "aerosol products" but does not include "architectural coatings." It is not known what fraction of the "aerosol products" in the EPA emission factor consist of paints and coatings. To make the two emission factors comparable, it is necessary to subtract architectural coatings from the result of the present study. Of the 2.70 lb/person/year for paints, primers, and varnishes, 2.34 lb/person/yr consist of architectural coatings; the scaled-up value is 2.60 lb/person/yr. The per-capita emission value to be compared with EPA's 6.3 lb/yr is thus 7.4 - 2.6 = 4.8 lb/yr.

The difference in per-capita emission factors could result from several causes, including reformulations of many consumer products, switching from organic aerosols to pump sprays, differences in the techniques used to derive the estimates, and random error inherent in the estimates. A review of an earlier edition of Household and Automotive Cleaners and Polishes [13] indicated a trend toward lower-VOC products.

5.4 ALTERNATIVE METHODS FOR ESTIMATING TOTAL VOC EMISSIONS

In apportioning emissions to states and counties, population may not be the best basis in all cases. For example, the use of automotive products may be related more to automobile registration than to population. Similarly window cleaners and other household products may be better related to the number of households. Even population-based apportionments could be improved by using the number of adults instead of the total population, since many products are not used by minors. The first two alternatives will be explored here.

5.4.1 Automotive Product Emissions

Emissions in six of the consumer product subcategories (car polishes and waxes, auto antifreeze, carburetor and choke cleaners, brake cleaners, engine degreasers, and engine starting fluids) may be apportioned on the basis of automobile-related activity. Vehicle miles traveled (VMT) are often used in calculating emissions from use of motor vehicles. As VMT data may not be readily available or up to date, we suggest that State and local agencies use vehicle registration as a surrogate. Table 5-1 shows U.S. emissions of total

VOC from use of the six automobile-related consumer product subcategories. (Midpoint values were taken from Table 4-2.) In 1986, 135,671,000 automobiles and light-duty trucks were registered in the U.S. [35]. Per-vehicle emission factors were derived by dividing total VOC emissions by this number.

Table 5-1

VOC EMISSION FACTORS FOR AUTOMOTIVE PRODUCTS, 1986[a]

Product	National VOC Emissions (tons/year)	lb/yr VOC Per Vehicle Registered
Car Polishes and Waxes	50,391	0.743
Auto Antifreeze	11,742	0.173
Carburetor and Choke Cleaners	13,093	0.193
Brake Cleaners	9,824	0.145
Engine Degreasers	5,192	0.077
Engine Starting Fluids	9,034	0.133

[a] Based on U.S. registration of 135,671,000 vehicles [35].

The emission factors in Table 5-1 can be used to estimate automotive product-related VOC emissions in each state. These emissions are derived by multiplying the product-specific emission factor by the number of vehicles registered in each state. State vehicle registration data were obtained from the Motor Vehicle Manufacturers Association [35]. Table 5-2 shows the results of these calculations. This apportionment method yields results which are quite similar to those using per-capita emission factors. For example, vehicle registration-based emissions from use of car waxes and polishes in the Northeast would be 19,730,000 lb/yr; this may be compared with a population-based estimate of 20,308,000 lb/yr.

By obtaining county-specific vehicle registration data, State and local air pollution control agencies can estimate total VOC emissions at the county level. Table 5-3 illustrates the application of this method to five counties.

Table 5-2

STATE-SPECIFIC VOC EMISSIONS DUE TO USE OF CONSUMER PRODUCTS

State	Vehicle Regist. (1,000)	Car Polishes and Waxes (1000 lb)	Auto Antifreeze (1000 lb)	Carburetor and Choke Cleaners (1000 lb)	Brake Cleaners (1000 lb)	Engine Degreasers (1000 lb)	Engine Starting Starting Fluid (1000 lb)
Alabama	2,417	1,795	418	467	350	185	322
Alaska	217	161	38	42	31	17	29
Arizona	1,662	1,235	288	321	241	127	221
Arkansas	939	698	163	181	136	72	125
California	15,384	11,428	2,663	2,969	2,228	1,177	2,049
Colorado	2,027	1,506	351	391	294	155	270
Connecticut	2,377	1,766	411	459	344	182	317
Delaware	383	285	66	74	55	29	51
District of Columbia	328	244	57	63	48	25	44
Florida	8,142	6,048	1,409	1,571	1,179	623	1,084
Georgia	3,375	2,507	584	651	489	258	449
Hawaii	589	438	102	114	85	45	78
Idaho	528	392	91	102	76	40	70
Illinois	6,137	4,559	1,062	1,185	889	470	817
Indiana	3,035	2,255	525	586	440	232	404
Iowa	1,988	1,477	344	384	288	152	265
Kansas	1,490	1,107	258	288	216	114	198
Kentucky	1,777	1,320	308	343	257	136	237
Louisiana	2,079	1,544	360	401	301	159	277
Maine	641	476	111	124	93	49	85
Maryland	2,771	2,058	480	535	401	212	369
Massachussetts	3,264	2,425	565	630	473	250	435
Michigan	5,762	4,280	997	1,112	834	441	767
Minnesota	2,744	2,038	475	530	397	210	365
Mississippi	1,375	1,021	238	265	199	105	183
Missouri	2,648	1,967	458	511	383	203	353
Montana	382	284	66	74	55	29	51

Table 5-2

STATE-SPECIFIC VOC EMISSIONS DUE TO USE OF CONSUMER PRODUCTS

(Continued)

State	Vehicle Regist. (1,000)	Car Polishes and Waxes (1000 lb)	Auto Antifreeze (1000 lb)	Carburetor and Choke Cleaners (1000 lb)	Brake Cleaners (1000 lb)	Engine Degreasers (1000 lb)	Engine Starting Starting Fluid (1000 lb)
Nebraska	842	625	146	163	122	64	112
Nevada	502	373	87	97	73	38	67
New Hampshire	854	634	148	165	124	65	114
New Jersey	4,428	3,289	766	855	641	339	590
New Mexico	732	544	127	141	106	56	97
New York	8,185	6,080	1,417	1,580	1,185	626	1,090
North Carolina	3,314	2,462	574	640	480	254	441
North Dakota	376	279	65	73	54	29	50
Ohio	6,972	5,179	1,207	1,346	1,010	534	928
Oklahoma	1,915	1,423	331	370	277	147	255
Oregon	1,561	1,160	270	301	226	119	208
Pennsylvania	5,980	4,442	1,035	1,154	866	458	796
Rhode Island	517	384	89	100	75	40	69
South Carolina	1,715	1,274	297	331	248	131	228
South Dakota	429	319	74	83	62	33	57
Tennessee	3,070	2,281	531	593	445	235	409
Texas	8,606	6,393	1,490	1,661	1,246	659	1,146
Utah	733	545	127	141	106	56	98
Vermont	315	234	55	61	46	24	42
Virginia	3,838	2,851	664	741	556	294	511
Washington	2,652	1,970	459	512	384	203	353
West Virginia	860	639	149	166	125	66	115
Wisconsin	2,528	1,878	438	488	366	193	337
Wyoming	286	212	50	55	41	22	38
National Total	135,671	100,782	23,483	26,186	19,648	10,383	18,067

Table 5-3

VOC EMISSIONS FROM USE OF AUTOMOTIVE PRODUCTS IN SELECTED COUNTIES

Product	Santa Barbara County, CA [36] Automobiles Reg. = 215,128 VOC Emissions (lb/yr)	Douglas County, NB [37] Automobiles Reg. = 221,295 VOC Emissions (lb/yr)	Wayne County, MI [38] Automobiles Reg. = 1,236,392 VOC Emissions (lbs/year)	Dade County, FL [39] Automobile Reg. = 1,306,743 VOC Emissions (lbs/year)	Castle County, DE [40] Automobile Reg. = 254,169 VOC Emissions (lbs/year)
Car Polishes and Waxes	159,806	164,387	918,443	970,702	188,807
Auto Antifreeze	37,236	38,303	214,004	226,181	43,994
Carburetor and Choke Cleaners	41,522	42,712	238,637	252,216	49,057
Brake Cleaners	31,155	32,048	179,055	189,244	36,809
Engine Degreasers	16,464	16,936	94,622	100,006	19,452
Engine Starting Fluids	28,648	29,469	164,647	174,016	33,847
Total VOC Emissions	314,831	323,856	1,809,409	1,912,365	371,966

5.4.2 Household-Based Apportionment

Certain types of consumer products, including all purpose cleaners, room deodorants and disinfectants, window and glass cleaners, and rug and upholstery cleaners, might be apportioned more accurately on the basis of households than on population. Rather than using household counts *per se*, however, we calculated "household-weighted preferences" in the same manner as we had calculated "population-weighted preferences" in Section 4.1.2. These values were computed by substituting regional household numbers for P_i in Equations 4-1 through 4-3. The number of households in each state in 1984 was obtained from the **State and Metropolitan Area Data Book 1986** [41]. Table 5-4 shows the household-based emission factors, by region, for the four consumer product subcategories mentioned above.

As an example, let us calculate VOC emissions from use of all-purpose cleaners in Connecticut. The midpoint household-based emission factor for this consumer product subcategory in New England ranges from 0 to 3.51, with a midpoint of 1.8 lb/yr per household. According to the Census Bureau [41], there were 1,094,000 households in Connecticut in 1984, the year on which the emission factor is based. Therefore, the midpoint VOC emission estimate is (1.8)(1,094,000) = 1,969,200 lb.

As in the case of automotive products, household-based emission estimates are similar to those based upon population. For example, the household- and population-based values for all purpose cleaners in the West are 20,380,000 and 20,185,000 lb/yr, respectively. In the Northeast, the respective values are 32,041,000 and 30,502,000 lb/yr.

5.5 ALTERNATIVE METHODS FOR ESTIMATING SPECIATED EMISSIONS

Where speciated emissions estimates are necessary, such as in compiling an air toxics emission inventory, a different approach than the one outlined in Section 4.2 might yield more realistic results, albeit at a greater cost to the State or local agency. This approach, which was used in a recent study for the

Table 5-4

PER-HOUSEHOLD EMISSION FACTORS FOR FOUR TYPES OF CONSUMER PRODUCTS

(Emissions in lb/yr VOC per household)

	All Purpose Cleaners			Room Deodorants and Disinfectants		
Marketing Region	Low	Midpoint	High	Low	Midpoint	High
New England	0.0	1.8	3.51	0.89	1.6	2.39
Middle Atlantic	0.0	1.8	3.51	0.89	1.6	2.39
East North Central	0.0	1.4	2.76	0.70	1.3	1.88
West North Central	0.0	1.4	2.76	0.70	1.3	1.88
South Atlantic	0.0	1.6	3.15	0.80	1.5	2.15
East South Central	0.0	1.6	3.15	0.80	1.5	2.15
West South Central	0.0	1.6	3.15	0.80	1.5	2.15
Mountain	0.0	1.2	2.38	0.61	1.1	1.62
Pacific	0.0	1.2	2.38	0.61	1.1	1.62

	Window and Glass Cleaners			Rug and Upholstery Cleaners		
Marketing Region	Low	Midpoint	High	Low	Midpoint	High
New England	0.00	0.7	1.35	0.00	0.1	0.17
Middle Atlantic	0.00	0.7	1.35	0.00	0.1	0.17
East North Central	0.00	0.5	1.06	0.00	0.1	0.13
West North Central	0.00	0.5	1.06	0.00	0.1	0.13
South Atlantic	0.00	0.6	1.21	0.00	0.1	0.15
East South Central	0.00	0.6	1.21	0.00	0.1	0.15
West South Central	0.00	0.6	1.21	0.00	0.1	0.15
Mountain	0.00	0.5	0.91	0.00	0.1	0.12
Pacific	0.00	0.5	0.91	0.00	0.1	0.12

California Air Resources Board to estimate solvent emissions from various consumer products [42], may be outlined as follows:

(1) From the State- or county-specific VOC inventory, identify the most important consumer product subcategories.

(2) From the appropriate version of the **Simmons Study of Media and Markets**, or other sources, identify the two or three most important brands of the product in the marketing region of interest.

(3) Alternatively, conduct a shelf survey at representative retail stores to obtain an approximate estimate of market shares. In a shelf survey, one visits three or four major retail vendors, such as supermarkets, hardware stores, or department stores, and, for each consumer product subcategory of interest, counts the number of units of each brand on the shelf. This exercise is also helpful in verifying the composition of each brand name.

(4) Obtain formulation data from product labels or formularies, such as Gosselin et al. [17], which report brand or trade names. As has been noted above, this may not yield useful information. It may be necessary to contact the manufacturers of the major brands to obtain more detailed composition data. Use the market share information to develop a composite species profile.

(5) Estimate total VOC use by the methods described in Section 4.1.

(6) Multiply the species profile weight fractions for each compound by the total VOC use.

SECTION 6
REFERENCES

1. Jones, A., H. Rich, G. Sewell, M. Rogozen, and M. Katz. 1986. Photochemically Reactive Organic Compound Emissions from Consumer and Commercial Products. Prepared by Science Applications International Corporation for the U.S. Environmental Protection Agency, Region II, Air Programs Branch, New York, NY, EPA-902/4-86-001.

2. U.S. Environmental Protection Agency. 1979. Trademarks and Product Names Reported in Conjunction With the Chemical Substance Initial Inventory. Trademarks and Product Names Section. Office of Toxic Substances, Washington, DC, TS-799.

3. Kuney, J.H. (Ed.). 1986. Chemcyclopedia. American Chemical Society, Washington, DC.

4. Anon. 1986. "Chemicalweek Buyer's Guide Issue 1987," Chemical Week 139(18):1-656.

5. Weast, R.C. and M.J. Astle (Eds.). 1981. CRC Handbook of Chemistry and Physics, 62nd Edition. CRC Press, Inc., Boca Raton, FL.

6. Verschueren, K. 1977. Handbook of Environmental Data on Organic Chemicals. Van Nostrand Reinhold Company, New York, NY.

7. U.S. Environmental Protection Agency. 1979. Toxic Substances Control Act Chemical Substance Inventory. Volumes II and III. User Guide and Indices to the Initial Inventory. Substance Name Index. Office of Toxic Substances, Washington, DC, TS-799.

8. U.S. Environmental Protection Agency. 1980. Toxic Substances Control Act Chemical Substance Inventory. Cumulative Supplement. Office of Toxic Substances, Washington, DC, TS-799.

9. Weber, R.C., P.A. Parker, and M. Bowser. 1981. Vapor Pressure Distribution of Selected Organic Chemicals. U.S. Environmental Protection Agency, Office or Research and Development, Industrial Environmental Research Laboratory, Cincinnati, OH, EPA-600/2-81-021.

10. Hass, H.B. and R.F. Newton. 1981. "Correction of Boiling Points to Standard Pressure," in R.C. Weast and M.J. Astle (Eds.), CRC Handbook of Chemistry and Physics, 62nd Edition, CRC Press, Inc., Boca Raton, FL, pp. D-164 to D-165.

11. SRI International and Chemical Marketing Services, Inc. 1986. The U.S. Paint Industry: Technology Trends, Markets, Raw Materials (formerly NPCA Data Bank Program). Prepared for the National Paint and Coatings Association, Washington, DC.

12. Flick, E.W. 1984. Cosmetic and Toiletry Formulations. Noyes Publications, Park Ridge, NJ.

13. Flick, E.W. 1986. Household and Automotive Cleaners and Polishes, 3rd Ed. Noyes Publications, Park Ridge, NJ.

14. Chalmers, L., revised by P. Bathe. 1979. Household and Industrial Chemical Specialties: Vols. I and II, Chemical Publishing, New York, NY.

15. Shakshir, L., P. Robinson, D. Verhagen, T. Donaldson, and W. Lim. 1982. "Analysis of Pressurized Products Relative to Hydrocarbon Propellants and Other Volatile Organic Compounds." Public Relations Committee, Western Aerosol Information Bureau.

16. Chemical Specialties Manufacturers Association, Inc. 1984. Pressurized Products Survey, United States 1984. Washington, DC.

17. Gosselin, R.E., R.P. Smith, and H.C. Hodge (Eds.). 1985. Clinical Toxicology of Commercial Products, 6th Ed. Williams and Wilkins, Inc., Baltimore, MD.

18. C.H. Kline and Company. 1982. Household Cleaning Products. Fairfield, NJ.

19. Simmons Market Research Bureau, Inc. 1985. Simmons 1985 Study of Media and Markets.

20. Stratta, J.J., P.W. Dillon, and R.H. Semp. 1978. "Evaporation of Organic Cosolvents from Water-borne Formulations: Theory, Experimental Study, Computer Simulation," Journal of Coatings Technology 50(647):39-47.

21. Shareef, G.S., W.A. Butler, L.A. Bravo, and M.B. Stockton. 1988. Air Emissions Species Manual. Volume I. Volatile Organic Compound Species Profiles. Prepared by Radian Corporation for the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Quality Management Division, and Office of Research and Development, Air and Energy Engineering Laboratory, Research Triangle Park, NC, Contract No. 68-02-3994, Work Assignment No. 122.

22. Simmons Market Research Bureau, Inc. 1983. Simmons 1983 Study of Media and Markets.

23. Simmons Market Research Bureau, Inc. 1984. Simmons 1984 Study of Media and Markets.

24. C.H. Kline and Company. 1981. Consumer Pesticides and Fertilizers. Fairfield, NJ.

25. C.H. Kline and Company. 1982. Household Cleaning Products. Fairfield, NJ.

26. Predicasts Terminal System (PTS). 1985. PTS PROMT, Record No. 1332619 (Drug Topics, May 20, 1985, p. 66).

27. Predicasts Terminal System (PTS). 1987. "United States Consumer Nondurables Production," PTS U.S. Time Series, Record No. 245041.

28. Predicasts Terminal System (PTS). 1987. "Antifreeze/coolant," PTS PROMT, Record. No. 1718881 (Aftermarket Business, April 1, 1987, p. 32).

29. Predicasts Terminal System (PTS). 1987. "United States Household Adhesives. Consumption by Consumers," PTS U.S. Time Series, Record No. 194883.

30. Gage, L. and M. Schlosser. 1983. Population Projections for California Counties 1980-2020 with Age/sex Detail to 2020, Baseline 83. State of California, Department of Finance, Sacramento, CA, 83-P-3.

31. Anon. 1987. "Adhesives and Sealants: a Booming $4 Billion Business," Chemical Week 140(10):26-48.

32. Broxterman, W. 1983. "Worldwide Challenges and Opportunities," Chemical Week (March 2).

33. Anon. 1986a. Adhesives and Sealants '86. A Chemical Week Special Advertising Section. Chemical Week 138(12):SAS 1 - SAS 36.

34. Lamason, W.H. and T. Lahre. 1979. Procedures for the Preparation of Emission Inventories for Volatile Organic Compounds, 2nd Ed. Volume I. U.S. Environmental Protection Agency, Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/2-77-028.

35. Motor Vehicle Manufacturers Association. 1987. MVMA Motor Vehicle Facts and Figures. Public Affairs Division, Detroit, MI.

36. Larson, J. 1988. Personal communication from State of California, Department of Motor Vehicles, Budget Office, Sacramento, CA (August 1).

37. Bauer, A. 1988. Personal communication from State of Nebraska, Department of Motor Vehicles, Lincoln, NE (August 1).

38. Meister, R. 1988. Personal communication from State of Michigan, Bureau of Information Systems, Lansing, MI (August 1).

39. Proctor, G. 1988. Personal communication from State of Florida, Department of Motor Vehicles, Tallahassee, FL (August 1).

40. Antonik, S.L. 1988. Letter from State of Delaware, Department of Public Safety, Division of Motor Vehicles, Dover, DE, to R. Baca, Science Applications International Corporation, Irvine, CA (July 6).

41. U.S. Department of Commerce. 1988. State and Metropolitan Area Data Book 1986. A Statistical Abstract Supplement. Bureau of the Census, Washington, DC.

42. Rogozen, M.B., R.D. Rapoport and A. Shochet. 1985. Development and Improvement of Organic Compound Emission Inventories for California. Prepared by Science Applications International Corporation for the California Air Resources Board, SAIC-85/1531.

43. Connolly, E.M., E.B. Helmes and J.C. Dean. 1982. NPCA Data Bank Program. Prepared by SRI International and Chemical Marketing Services, Inc. for the National Paint and Coatings Association, Washington, D.C.

44. Pope, A.A., P.A. Cruse and S. C. Most. 1988. Toxic Air Pollutant Emission Factors--A Compilation for Selected Air Toxic Compounds and Sources. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Quality Management Division, Research Triangle Park, NC, EPA-450/2-88-006a.

45. Jones, L.P. 1989. Personal communication from State of California, Air Resources Board, Industrial Section, Sacramento, CA (January 20).

46. Lahre, T.F. 1986. Compiling Air Toxics Emission Inventories. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Monitoring and Data Analysis Division, Air Management Technology Branch, Research Triangle Park, NC, EPA-450/4-86-010.

APPENDIX A

ORIGINAL CONSUMER PRODUCT CATEGORIES LIST

October 10, 1985

AVAILABILITY OF DATA BY PRODUCT CATEGORY

CATEGORIES	USAGE	COMPOSITION	GEOGRAPHIC	OLD/NEW DATA
I. PROPELLENT PRODUCTS (ONLY)				
A. Paints and Finishes:				
1. Paints	YES	YES	YES	NEW
2. Primers	YES	YES	YES	NEW
3. Varnishes	YES	YES	YES	NEW
4. Other Related Products				
a. strippers	NO	YES	NO	N/A
b. graffiti removers	NO	YES	NO	N/A
c. show and decorative products	NO	YES	NO	N/A
B. Household Products:				
1. Laundry Products				
a. starch	YES	YES	NO	NEW
b. fabric finish	YES	NO	NO	NEW
2. Other Household Products				
a. dyes	YES	YES	NO	NEW
b. fuels	NO	YES	NO	N/A
c. anti-static sprays	YES	NO	NO	NEW
d. fabric stain repellents	NO	NO	NO	N/A
C. Personal Care Products:				
1. Other Hair Care Products-mousses	YES	NO	NO	NEW
2. Spray Powders	YES	NO	YES	NEW
3. Other Personal Care Products-breath freshers	YES	YES	YES	NEW

AVAILABILITY OF DATA BY PRODUCT CATEGORY (Continued)

CATEGORIES	USAGE	COMPOSITION	GEOGRAPHIC	OLD/NEW DATA
D. Automotive and Industrial Products:				
1. Refrigerants	NO	NO	NO	N/A
2. Engine Degreasers	YES	YES	NO	NEW
3. Lubricants and Silicones				
a. penetrating oils	YES	YES	NO	NEW
b. demoisturizers	NO	YES	NO	N/A
c. rust proofing	NO	YES	NO	N/A
d. mold release	NO	NO	NO	N/A
4. Undercoatings	YES	YES	NO	NEW
5. Break Cleaners	NO	NO	NO	N/A
6. Tire Sealants and Inflators	YES	YES	NO	NEW
7. Carburator and Choke Cleaners	YES	YES	NO	NEW
8. Engine Starting Fluids	YES	YES	NO	NEW
E. Food Products:				
1. Cheese Spread	YES	NO	NO	NEW
2. Whipped Cream	NO	NO	NO	N/A
3. Pan Sprays	NO	YES	NO	N/A

AVAILABILITY OF DATA BY PRODUCT CATEGORY (Continued)

CATEGORIES	USAGE	COMPOSITION	GEOGRAPHIC	OLD/NEW DATA
II. COMBINATION PRODUCTS (BOTH PROPELLENT AND NON-PROPELLENT)				
A. Insecticides:				
1. Space Insecticides	YES	YES	NO	NEW
2. Residual Insecticides				
a. personal and surface repellents	NO	YES	NO	N/A
b. moth proofers	NO	YES	NO	N/A
B. Herbicides and Fungicides:	YES	YES	NO	NEW
C. Household Products:				
1. Room Deodorants and Disinfectants	YES	YES	YES	NEW
2. Cleaners				
a. window and glass cleaners	YES	YES	YES	NEW
b. oven	YES	YES	YES	NEW
c. rug and upholstery	YES	YES	YES	NEW
d. fabric	NO	NO	NO	N/A
e. wall	NO	YES	NO	N/A
f. tile	YES	YES	YES	NEW
3. Laundry Products				
a. prewash	YES	YES	YES	NEW
b. spot removers	YES	YES	NO	NEW

AVAILABILITY OF DATA BY PRODUCT CATEGORY (Continued)

CATEGORIES	USAGE	COMPOSITION	GEOGRAPHIC	OLD/NEW DATA
4. Waxes and Polishes				
a. shoe polishes	YES	YES	NO	NEW
b. leather dressings	NO	YES	NO	N/A
c. furniture waxes and polishes	YES	YES	YES	NEW
5. Adhesives	YES	YES	NO	OLD
6. Other Household Products				
a. rug deodorizers and fresheners	YES	YES	NO	NEW
b. drain openers	YES	YES	YES	NEW
D. Personal Care Products:				
1. Shaving Lathers	YES	YES	YES	NEW
2. Hair Sprays	YES	YES	YES	NEW
3. Other Hair Care Products				
a. rinses and conditioners	YES	YES	YES	NEW
b. shampoo	YES	YES	YES	NEW
4. Pharmaceuticals				
a. vaporizers	YES	NO	NO	NEW
b. fungicides	YES	YES	YES	NEW
c. burn treatments	YES	YES	NO	NEW
d. antiseptics	YES	YES	NO	NEW
e. contraceptives	YES	NO	NO	NEW
5. Colognes, Perfumes, After-shave				
a. colognes	YES	YES	YES	NEW
b. perfumes	YES	YES	YES	NEW
c. after-shave	YES	YES	YES	NEW

AVAILABILITY OF DATA BY PRODUCT CATEGORY (Continued)

CATEGORIES	USAGE	COMPOSITION	GEOGRAPHIC	OLD/NEW DATA
6. Personal Deodorants and Antiperspirants				
a. deodorants and antiperspirants	YES	YES	YES	NEW
b. deodorant colognes	NO	NO	NO	N/A
7. Other Personal Care Products				
a. suntan preparations	YES	YES	YES	NEW
b. depilatories	YES	YES	NO	NEW
E. Animal Products-Veterinarian and Pet Products:				
1. Shampoo	NO	YES	NO	N/A
2. Insecticides	NO	YES	NO	N/A
3. Repellents	NO	YES	NO	N/A
F. Automotive and Industrial Products:				
1. Cleaners				
a. automotive upholstery	YES	YES	NO	NEW
b. leather	NO	YES	NO	N/A
c. vinyl	YES	YES	NO	NEW
d. dressings	NO	YES	NO	N/A
e. tire cleaners	YES	YES	NO	NEW
2. Auto Windshield Washer Fluid and De-icer	YES	YES	NO	NEW
3. Caulking and Sealing Compounds	YES	YES	NO	OLD

AVAILABILITY OF DATA BY PRODUCT CATEGORY (Continued)

CATEGORIES	USAGE	COMPOSITION	GEOGRAPHIC	OLD/NEW DATA
III. NON-PROPELLENT PRODUCTS (ONLY)				
A. Personal Care Products:				
1. Nail Polishes	YES	YES	YES	NEW
2. Nail Polish Removers	NO	YES	NO	N/A
3. Pre-shave Preparations	YES	YES	YES	NEW
4. Rubbing Compounds (alcohol)	YES	YES	YES	NEW
5. Face Washes (astringents and witch hazel)	YES	YES	NO	NEW
6. Facial Creams and Washes	YES	YES	YES	NEW
7. Hand Lotions	YES	YES	YES	NEW
8. Mouthwashes	YES	YES	YES	NEW
B. Household Products:				
1. Ball Point and Porous Point Pens				
a. ball point	NO	YES	NO	N/A
b. porous point	NO	YES	NO	N/A
2. Floor Cleaners	YES	YES	YES	NEW
3. Floor Waxes	YES	YES	YES	NEW
4. Metal Cleaners and Polishes	YES	YES	NO	NEW

AVAILABILITY OF DATA BY PRODUCT CATEGORY (Continued)

CATEGORIES	USAGE	COMPOSITION	GEOGRAPHIC	OLD/NEW DATA
C. Automotive and Industrial Products:				
1. Barbeque Lighter Fluids	NO	YES	NO	N/A
2. Antifreezes	YES	YES	YES	NEW
3. Auto Cleaners, Polishes, and Waxes	YES	YES	YES	NEW
4. Auto Degreasers	YES	YES	NO	NEW

YES - data is available
NO - data is not available
NEW - recent data-after 1980
OLD - old data-1980 or before
N/A - not applicable-age dependent data not available

APPENDIX B

SPECIES PROFILES FOR INDIVIDUAL FORMULATIONS

Table B-1

FORMULATION PROFILES FOR PAINTS, PRIMERS AND VARNISHES

FORMULATION 1: (ARCH. CTG., WATER-BASED, INTER., FLAT) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		GLYCOL ETHERS AND ESTER ETHERS	50.00	14.00	17.65
		MISCELLANEOUS	50.00	1.80	2.27
43369	57-55-6	PROPYLENE GLYCOL	76.11	28.70	23.76
43370	107-21-1	ETHYLENE GLYCOL	62.10	55.50	56.32

FORMULATION 2: (ARCH. CTG., WATER-BASED, INTER., GLOSS) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		OTHER KETONES AND ESTERS	50.00	3.80	4.89
		GLYCOL ETHERS AND ESTER ETHERS	50.00	17.40	22.41
		MISCELLANEOUS	50.00	2.30	2.96
43369	57-55-6	PROPYLENE GLYCOL	76.11	50.20	42.47
43370	107-21-1	ETHYLENE GLYCOL	62.10	26.30	27.27

FORMULATION 3: (ARCH. CTG., WATER-BASED, INTER., OTHER) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		GLYCOL ETHERS AND ESTER ETHERS	50.00	18.40	22.09
43370	107-21-1	ETHYLENE GLYCOL	62.10	80.60	77.91

FORMULATION 4: (ARCH. CTG., OIL-BASED, INTER., FLAT) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	99.29	99.38
45102	1330-20-7	ISOMERS OF XYLENE	106.17	.71	.62

Table B-1

FORMULATION PROFILES FOR PAINTS, PRIMERS AND VARNISHES

(Continued)

FORMULATION 5: (ARCH. CTG., OIL-BASED, INTER., GLOSSY) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	98.70	99.38
45102	1330-20-7	ISOMERS OF XYLENE	106.17	1.30	.62

FORMULATION 6: (ARCH. CTG., OIL-BASED, INTER., VARNISH) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	94.40	95.30
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	5.60	4.70

FORMULATION 7: (ARCH. CTG., OIL-BASED, INTER., OTHER) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	98.40	98.67
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	1.60	1.33

FORMULATION 8: (ARCH. CTG., WATER-BASED, EXTER., HOUSE PAINT) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		OTHER KETONES AND ESTERS	50.00	43.70	49.07
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	1.30	1.21
43370	107-21-1	ETHYLENE GLYCOL	62.10	55.00	49.72

Table B-1

FORMULATION PROFILES FOR PAINTS, PRIMERS AND VARNISHES

(Continued)

FORMULATION 9: (ARCH. CTG., WATER-BASED, EXTERIOR, TRIM) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		OTHER KETONES AND ESTERS	50.00	45.50	52.76
		GLYCOL ETHERS AND ESTER ETHERS	50.00	0.00	0.00
43369	57-55-6	PROPYLENE GLYCOL	76.11	21.20	16.15
43370	107-21-1	ETHYLENE GLYCOL	62.10	33.30	31.09

FORMULATION 10: (ARCH. CTG., WATER-BASED, EXTERIOR, STAIN) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		OTHER KETONES AND ETHERS	50.00	34.60	39.65
43370	107-21-1	ETHYLENE GLYCOL	62.10	65.40	60.35

FORMULATION 11: (ARCH. CTG., WATER-BASED, EXTER., OTHER) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		OTHER KETONES AND ESTERS	50.00	24.50	28.73
		GLYCOL ETHERS AND ESTER ETHERS	50.00	0.00	0.00
43370	107-21-1	ETHYLENE GLYCOL	62.10	75.50	71.27

FORMULATION 12: (ARCH. CTG., OIL-BASED, EXTER., HOUSE PAINT) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	97.80	1.96
45102	1330-20-7	ISOMERS OF XYLENE	106.17	2.20	.02

Table B-1

FORMULATION PROFILES FOR PAINTS, PRIMERS AND VARNISHES

(Continued)

FORMULATION 13: (ARCH. CTG., OIL-BASED, EXTER., ENAMEL) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	100.00	100.00

FORMULATION 14: (ARCH. CTG., OIL-BASED, EXTER., PRIMER) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	100.00	100.00

FORMULATION 15: (ARCH. CTG., OIL-BASED, EXTER., VARNISH) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	100.00	100.00

FORMULATION 16: (ARCH. CTG., OIL-BASED, EXTER., STAINS) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	100.00	100.00

Table B-1

FORMULATION PROFILES FOR PAINTS, PRIMERS AND VARNISHES

(Continued)

FORMULATION 17: (ARCH. CTG., OIL-BASED, EXTER., OTHER) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	100.00	100.00

FORMULATION 18: (AEROSOL PAINTS) PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROCARBONS	50.00	58.00	73.16
43802	75-09-2	METHYLENE CHLORIDE	84.93	11.73	8.71
43814	71-55-6	1,1,1-TRICHLOROETHANE	133.41	2.07	.98
45102	1330-20-7	ISOMERS OF XYLENE	106.17	10.20	6.06
45202	108-88-3	TOLUENE	92.10	16.20	11.09

Table B-2

FORMULATION PROFILES FOR HAIR SPRAYS

FORMULATION : 1

PCT.VOC: 97

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	48.45	71.16
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	51.55	28.84

FORMULATION : 2

PCT.VOC: 97

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	48.45	71.16
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	51.55	28.84

FORMULATION : 3

PCT.VOC: 96

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	47.92	70.71
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	52.08	29.29

FORMULATION : 4

PCT.VOC: 96

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	47.92	70.71
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	52.08	29.29

Table B-2
FORMULATION PROFILES FOR HAIR SPRAYS
(Continued)

FORMULATION : 5

PCT.VOC: 96

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	47.92	70.71
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	52.08	29.29

FORMULATION : 6

PCT.VOC: 96

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	47.92	70.71
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	52.08	29.29

FORMULATION : 7

PCT.VOC: 7

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	48.45	71.16
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	51.55	28.84

FORMULATION : 8

PCT.VOC: 97

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	48.45	72.41
43811	75-69-4	TRICHLOROFLUOROMETHANE			
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	25.77	14.68

Table B-2

FORMULATION PROFILES FOR HAIR SPRAYS

(Continued)

FORMULATION : 9 PCT.VOC: 90.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	92.55	94.19
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	7.45	5.81

FORMULATION : 10 PCT.VOC: 97

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL	50.00	.31	
43302	64-17-5	ETHYL ALCOHOL	46.07	37.71	
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	30.99	
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	30.99	

FORMULATION : 11 PCT.VOC: 96

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL		.31	.63
43302	64-17-5	ETHYL ALCOHOL		10.42	22.86
43802	75-09-2	METHYLENE CHLORIDE		15.62	18.60
43811	75-69-4	TRICHLOROFLUOROMETHANE		36.82	27.11
43823	75-71-8	DICHLORODIFLUOROMETHANE		36.82	30.79

Table B-2
FORMULATION PROFILES FOR HAIR SPRAYS
(Continued)

FORMULATION : 12 PCT.VOC: 96

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL	50.00	.31	.66
43302	64-17-5	ETHYL ALCOHOL	46.07	4.17	9.59
43802	75-09-2	METHYLENE CHLORIDE	84.93	26.04	32.50
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	34.74	26.80
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	34.74	30.45

FORMULATION : 13 PCT.VOC: 95

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL	50.00	.32	.47
43302	64-17-5	ETHYL ALCOHOL	46.07	36.46	58.98
43802	75-09-2	METHYLENE CHLORIDE	84.93	10.54	9.25
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	15.81	8.58
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.90	36.88	22.73

FORMULATION : 14 PCT.VOC: 95

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL	50.00	.32	.44
43302	64-17-5	ETHYL ALCOHOL	46.07	41.68	62.77
43454	84-66-2	DIETHYLPHTHALATE	222.20	.11	.03
43802	75-09-2	METHYLENE CHLORIDE	84.93	15.79	12.90
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	4.21	2.13
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	37.89	21.74

Table B-2
FORMULATION PROFILES FOR HAIR SPRAYS
(Continued)

FORMULATION : 15 PCT.VOC: 99.9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL	50.00	.30	.55
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	29.63	45.49
43802	75-09-2	METHYLENE CHLORIDE	84.93	10.01	10.87
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	30.03	20.17
43823	75-71-8	DICHLOROFLUOROMETHANE	120.91	30.03	22.91

FORMULATION : 16 PCT.VOC: 93.9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL	50.00	.32	.50
43302	64-17-5	ETHYL ALCOHOL	46.07	35.78	60.68
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	31.95	18.17
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	31.95	20.64

FORMULATION : 17 PCT.VOC:

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		ESSENTIAL OIL	50.00	.31	.48
43302	64-17-5	ETHYL ALCOHOL	46.07	37.19	62.12
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	31.25	17.51
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	31.25	19.89

Table B-2

FORMULATION PROFILES FOR HAIR SPRAYS

(Continued)

FORMULATION : 18

PCT.VOC: 98

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	28.57	52.76
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	35.71	22.12
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	35.71	25.13

FORMULATION : 19

PCT.VOC: 66

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	42.42	68.49
43811	75-69-4	TRICHLOROFLUOROMETHANE	137.36	53.03	28.71
43823	75-71-8	DICHLORODIFLUOROMETHANE	120.91	4.55	2.80

Table B-3
FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

FORMULATIONS : 1-2,4-20,23,25-29,33-34,37,39-51,56-64, 68-72,86-87,89-92,95,98,101-102,107-110, 112-116,118,120 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 3 PCT.VOC: 27.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	50.00	36.36	20.13
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	63.64	79.87

FORMULATION : 9 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

FORMULATION : 10 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 18 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

FORMULATION : 21 PCT.VOC: 3.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43369	57-55-6	PROPYLENE GLYCOL	90.10	100.00	100.00

FORMULATION : 22 PCT.VOC: 3.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43369	57-55-6	PROPYLENE GLYCOL	90.10	100.00	100.00

FORMULATION : 23 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

Table B-3
FORMULATION PROFILES FOR ALL PURPOSE CLEANERS
(Continued)

FORMULATION : 24 PCT.VOC:

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43369	57-55-6	PROPYLENE GLYCOL	90.10	100.00	100.00

FORMULATION :30 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 31 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 32 PCT.VOC: 5.00

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

Table B-3
FORMULATION PROFILES FOR ALL PURPOSE CLEANERS
(Continued)

FORMULATION : 35 PCT.VOC: 42

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	50.00	35.71	35.71
43125	8008-20-6	KEROSENE	50.00	64.29	64.29

FORMULATION : 36 PCT.VOC: 33

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	50.00	9.09	9.09
43125	8008-20-6	KEROSENE	50.00	90.91	90.91

FORMULATION : 38 PCT.VOC: 6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43369	57-55-6	PROPYLENE GLYCOL	90.10	100.00	100.00

FORMULATION : 52 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 53 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

FORMULATION : 54 PCT.VOC: 2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43310	109-86-4	METHYL CELLOSOLVE	761.10	100.00	100.00

FORMULATION : 55 PCT.VOC:

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 65 PCT.VOC: 3

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 66 PCT.VOC: 3

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 67 PCT.VOC:

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 73 PCT.VOC: 3

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43354	5131-66-8	PROPYLENE GLYCOL BUTYL ETHER	132.20	100.00	100.00

FORMULATION : 74 PCT.VOC: 6.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

Table B-3
FORMULATION PROFILES FOR ALL PURPOSE CLEANERS
(Continued)

FORMULATION : 75 PCT.VOC: 5.00

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 76 PCT.VOC: 3.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 77 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 78 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 79

PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 80

PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 81

PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	73	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 82

PCT.VOC: 10

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

Table B-3
FORMULATION PROFILES FOR ALL PURPOSE CLEANERS
(Continued)

FORMULATION : 83 PCT.VOC: 8.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 84 PCT.VOC: 6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 85 PCT.VOC: 10

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	2-(2-BUTOXYETHOXY)-ETHANOL	162.23	100.00	100.00

FORMULATION : 88 PCT.VOC: 2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43777	141-43-5	ETHANOLAMINE	61.01	100.00	100.00

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 93 PCT.VOC: 8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 94 PCT.VOC: 8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 96 PCT.VOC: 15.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	50.00	4.12	6.59
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	53.85	71.61
43355	8000-41-7	TERPINEOL	154.11	42.03	21.80

FORMULATION : 97 PCT.VOC: 15.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	50.00	4.12	6.59
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	53.85	71.61
43355	8000-41-7	TERPINEOL	154.11	42.03	21.80

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 98 PCT.VOC: 0.00

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

FORMULATION : 99 PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	BUTYL CELLOSOLVE	162.23	100.00	100.00

FORMULATION : 100 PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43312	112-34-5	BUTYL CELLOSOLVE	162.23	100.00	100.00

FORMULATION : 103 PCT.VOC: 20

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-03-9	PINE OIL	50.00	9.00	23.36
43355	8000-41-7	TERPINEOL	154.11	91.00	76.64

Table B-3
FORMULATION PROFILES FOR ALL PURPOSE CLEANERS
(Continued)

FORMULATION : 104 PCT.VOC: 16.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-03-9	PINE OIL	50.00	9.33	24.09
43355	8000-41-7	TERPINEOL	154.11	90.67	75.91

FORMULATION : 105 PCT.VOC: 6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 106 PCT.VOC: 2.65

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 111 PCT.VOC: 10.00

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 117 PCT.VOC: 5.1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	50.00	1.96	3.48
43369	57-55-6	PROPYLENE GLYCOL	76.10	98.04	96.52

FORMULATION : 119 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 121 PCT.VOC: 28

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43125	8008-20-6	KEROSENE	50.00	17.86	32.71
43369	57-55-6	PROPYLENE GLYCOL	76.10	10.71	10.89
45101	8032-32-4	VM&P NAPHTHA	116.00	71.43	56.40

FORMULATION : 122 PCT.VOC: 3

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

Table B-3

FORMULATION PROFILES FOR ALL PURPOSE CLEANERS

(Continued)

FORMULATION : 123

PCT.VOC: 3

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

Table B-4

FORMULATION PROFILES FOR INSECT SPRAYS

FORMULATION : 1 PCT.VOC: 86.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50	100	100

FORMULATION : 2 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	62-73-7	DICHLOROVINYL DIMETHYLPHOSPHATE	220.98	20.00	5.35
		INERT INGREDIENTS	50	80.00	94.65

FORMULATION : 3 PCT.VOC: 99.32

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50	59.52	62.15
43000	8002-05-9	PETROLEUM DISTILLATES	50	10.27	10.72
43212	106-97-8	N-BUTANE	58.12	15.10	13.57
43214	75-28-5	ISOBUTANE	58.12	15.10	13.57

Table B-4

FORMULATION PROFILES FOR INSECT SPRAYS

(Continued)

FORMULATION : 4 PCT.VOC: 99.15

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50.00	68.49	71.63
	62-73-7	DICHLOROVINYL DIMETHYLPHOSPHATE	220.98	.20	.05
43000	8002-05-9	PETROLEUM DISTILLATES	50.00	1.05	1.10
43212	106-97-8	N-BUTANE	58.12	15.13	13.61
43214	75-28-5	ISOBUTANE	58.12	15.13	13.61

FORMULATION : 5 PCT.VOC: 98.95

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50.00	68.63	71.67
43000	8002-05-9	PETROLEUM DISTILLATES	50.00	1.05	1.10
43212	106-97-8	N-BUTANE	58.12	15.16	13.62
43214	75-28-5	ISOBUTANE	58.12	15.16	13.62

FORMULATION : 6 PCT.VOC: 99.83

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50.00	58.10	60.64
43000	8002-05-9	PETROLEUM DISTILLATES	50.00	11.85	12.37
43212	106-97-8	N-BUTANE	58.12	15.03	13.49
43214	75-28-5	ISOBUTANE	58.12	15.03	13.49

Table B-4
FORMULATION PROFILES FOR INSECT SPRAYS
(Continued)

FORMULATION : 7

PCT.VOC: 98.55

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50.00	61.39	64.12
43000	8002-05-9	PETROLEUM DISTILLATES	50.00	8.17	8.53
43212	106-97-8	N-BUTANE	58.12	15.22	13.68
43214	75-28-5	ISOBUTANE	58.12	15.22	13.68

FORMULATION : 8

PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC	—				

FORMULATION : 9

PCT.VOC: 99.91

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50.00	68.67	72.11
	8002-09-3	PINE OIL	136.23	.90	.35
43000	8002-05-9	PETROLEUM DISTILLATES	50.00	.40	.42
43212	106-97-8	N-BUTANE	58.12	15.01	13.56
43214	75-28-5	ISOBUTANE	58.12	15.01	13.56

Table B-4

FORMULATION PROFILES FOR INSECT SPRAYS

(Continued)

FORMULATION : 10 PCT.VOC: 55.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INSECTICIDE SOLUTION IN KEROSENE	50	27.93	31.05
43212	106-97-8	N-BUTANE	58.12	72.07	68.95

Table B-5

FORMULATION PROFILES FOR CAR POLISHES AND WAXES

FORMULATION : 1 PCT.VOC: 10.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		FAXAM 22	50.00	47.62	48.95
43118	8032-32-4	MINERAL SPIRITS	50.00	47.62	48.95
43739	100-37-8	DIETHYLAMINOETHANOL	117.07	4.76	2.09

FORMULATION : 2 PCT.VOC: 22.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		SOLVENT	50.00	100.00	100.00

FORMULATION : 3 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 4 PCT.VOC: 35.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	94.12	96.53
43742	110-91-8	MORPHOLINE	87.04	5.88	3.47

Table B-4
FORMULATION PROFILES FOR INSECT SPRAYS
(Continued)

FORMULATION : 10 PCT.VOC: 55.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INSECTICIDE SOLUTION IN KEROSENE	50	27.93	31.05
43212	106-97-8	N-BUTANE	58.12	72.07	68.95

Table B-5

FORMULATION PROFILES FOR CAR POLISHES AND WAXES

(Continued)

FORMULATION : 5 PCT.VOC: 32.9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	97.26	98.41
43742	110-91-8	MORPHOLINE	87.04	2.74	1.59

FORMULATION : 6 PCT.VOC: 2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43742	110-91-8	MORPHOLINE	87.04	100.00	100.00

FORMULATION : 7 PCT.VOC: 23.28

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

FORMULATION : 8 PCT.VOC: .4

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43742	110-91-8	MORPHOLINE	87.04	100.00	100.00

Table B-5
FORMULATION PROFILES FOR CAR POLISHES AND WAXES
(Continued)

FORMULATION : 9 PCT.VOC: 30.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	64.94	65.66
43125	8008-20-6	KEROSENE	50.00	32.47	32.83
43742	110-91-8	MORPHOLINE	87.04	2.60	1.51

FORMULATION : 10 PCT.VOC: 26.4

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	62.12	62.12
43125	8008-20-6	KEROSENE	50.00	37.88	37.88

FORMULATION : 11 PCT.VOC: 23.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	46.81	48.80
43125	8008-20-6	KEROSENE	50.00	42.55	44.37
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	1.70	1.48
43742	110-91-8	MORPHOLINE	87.04	8.94	5.35

FORMULATION : 12 PCT.VOC: 11.11

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		SOLVENT L-40	50.00	2.60	48.96
43118	8032-32-4	MINERAL SPIRITS	50.00	32.47	50.10
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	64.94	.95

Table B-5
FORMULATION PROFILES FOR CAR POLISHES AND WAXES
(Continued)

FORMULATION : 13 PCT.VOC: 26.15

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	31.06	61.35
43125	8008-20-6	KEROSENE	50.00	18.94	38.27
43308	67-63-0	ISO-PROPYL ALCOHOL	60.10	50.00	.38

FORMULATION : 14 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 15 PCT.VOC: 57.75

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	99.57	99.57
43125	8008-20-6	KEROSENE	50.00	.43	.43

FORMULATION :16 PCT.VOC: 70

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	82.08	82.08
43125	8008-20-6	KEROSENE	50.00	17.92	17.92

Table B-5

FORMULATION PROFILES FOR CAR POLISHES AND WAXES

(Continued)

FORMULATION : 17 PCT.VOC: 26

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	61.54	61.54
43125	8008-20-6	KEROSENE	50.00	38.46	38.46

FORMULATION : 18 PCT.VOC: 9.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		SOLVENT L-410	50.00	100.00	100.00

FORMULATION : 19 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 20 PCT.VOC: 96

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

Table B-5
FORMULATION PROFILES FOR CAR POLISHES AND WAXES
(Continued)

FORMULATION : 21 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 22 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 23 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 24 PCT.VOC: 94

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

Table B-5

FORMULATION PROFILES FOR CAR POLISHES AND WAXES

(Continued)

FORMULATION :25 PCT.VOC: 1.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	74.07	83.26
43742	110-91-8	MORPHOLINE	87.04	25.93	16.74

FORMULATION : 26 PCT.VOC: 17.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		SOLVENT L-140		97.14	97.61
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	2.86	2.39

FORMULATION : 27 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 28 PCT.VOC: 31

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	48.39	49.06
43125	8008-28-6	KEROSENE	50.00	48.39	49.06
43742	110-91-8	MORPHOLINE	87.04	3.23	1.88

Table B-5

FORMULATION PROFILES FOR CAR POLISHES AND WAXES

(Continued)

FORMULATION : 29 PCT.VOC: 35.6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

FORMULATION : 30 PCT.VOC: 72.7

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

FORMULATION : 31 PCT.VOC: 78.18

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

FORMULATION : 32 PCT.VOC: 23.6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

Table B-5
FORMULATION PROFILES FOR CAR POLISHES AND WAXES
(Continued)

FORMULATION : 33 PCT.VOC: 31.1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	88.42	93.01
43742	110-91-8	MORPHOLINE	87.04	11.58	6.99

FORMULATION : 34 PCT.VOC: 40

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	90.00	94.00
43742	110-91-8	MORPHOLINE	87.04	10.00	6.00

Table B-6
FORMULATION PROFILES FOR ROOM DEODORANTS AND DISINFECTANTS

FORMULATION : 1 PCT.VOC: 92

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	.57	.69
43304	63-67-0	ISO-PROPYL ALCOHOL	60.10	99.43	99.31

FORMULATION : 2 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	1.26	1.48
43302	64-17-5	ETHYL ALCOHOL	46.07	50.53	64.32
43369	57-55-6	PROPYLENE GLYCOL	76.11	11.37	8.76
43802	75-09-2	METHYLENE CHLORIDE	84.93	36.84	25.44

FORMULATION : 3 PCT.VOC: 51.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	.97	1.15
43212	106-98-8	N-BUTANE	58.12	77.67	79.04
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	15.53	15.29
43369	57-55-6	PROPYLENE GLYCOL	76.11	5.83	4.53

FORMULATION : 4 PCT.VOC: 35.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	1.41	1.63
43212	106-97-8	N-BUTANE	58.12	98.59	98.37

Table B-7
FORMULATION PROFILES FOR (CONSUMER) ADHESIVES

FORMULATION : 1 PCT.VOC: 3

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		PETROLEUM OIL	50.00	100.00	100.00

FORMULATION : 2 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 3 PCT.VOC:

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 4 PCT.VOC: 12

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		PETROLEUM OIL	50.00	100.00	100.00

Table B-7

FORMULATION PROFILES FOR (CONSUMER) ADHESIVES

(Continued)

FORMULATION : 5

PCT.VOC: 80

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45202	108-88-3	TOLUENE	92.10	100.00	100.00

FORMULATION : 6

PCT.VOC: 85

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43300		ETHYL ALCOHOL 74 OP	46.07	51.76	69.80
43436	628-63-7	AMYL ACETATE	130.20	28.24	13.47
43551	67-64-1	ACETONE	58.08	12.94	13.84
43571	76-22-2	CAMPHORE	152.24	7.06	2.88

FORMULATION : 7

PCT.VOC: 59.4

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43300	107-21-1	TESCOL	62.07	19.19	26.63
43755	79-46-9	NITROPROPANE (1-.2-)	89.09	5.05	4.88
45202	108-88-3	TOLUENE	92.10	72.39	67.70
45479	1330-78-5	TRICRESYL PHOSPHATE	368.37	3.37	.79

Table B-8

FORMULATION PROFILES FOR CAULKING AND SEALING COMPOUNDS

FORMULATION : 1 PCT.VOC: 12

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	16.67	26.11
45102	1330-20-7	ISOMERS OF XYLENE	106.17	83.33	73.89

FORMULATION : 2 PCT.VOC: 20

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45102	1330-20-7	ISOMERS OF XYLENE	106.17	100.00	100.00

FORMULATION : 3 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-9

FORMULATION PROFILES FOR MOTH CONTROL PRODUCTS

FORMULATION : 1 PCT.VOC: 97.95

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50.00	45.94	45.94
43000	8002-05-9	PETROLEUM DISTILLATES	50.00	54.06	54.06

FORMULATION : 2 PCT.VOC: 99.6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS		92.22	95.33
43000		ISOPARAFFINS	86.18	7.78	4.67

FORMULATION : 3 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45807	106-46-7	P-DICHLOROBENZENE	147.00	100.00	100.00

Table B-10

FORMULATION PROFILES FOR WINDOW AND GLASS CLEANERS

FORMULATION : 1 PCT.VOC: 12.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	100.00	100.00

FORMULATION : 2 PCT.VOC: 10

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	100.00	100.00

FORMULATION : 3 PCT.VOC: 8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8024-43-9	PERFUME	50.00	0.00	0.00
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	100.00	100.00

FORMULATION : 4 PCT.VOC: 13.60

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8024-43-9	PERFUME	50.00	0.00	0.00
43204	74-98-6	PROPANE	44.11	5.79	7.67
43212	106-97-8	N-BUTANE	58.12	22.74	22.85
43214	75-28-5	ISOBUTANE	58.12	.88	.89
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	70.59	68.60

Table B-10

FORMULATION PROFILES FOR WINDOW AND GLASS CLEANERS

(Continued)

FORMULATION : 5 PCT.VOC: 47.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	100.00	100.00

FORMULATION : 6 PCT.VOC: 12.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43204	74-98-6	PROPANE	44.11	4.92	7.06
43212	106-97-8	N-BUTANE	58.12	19.32	21.01
43214	75-28-5	ISOBUTANE	58.12	.75	.82
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	60.00	63.09
43308	111-76-2	BUTYL CELLOSOLVE	118.17	15.00	8.02

FORMULATION : 7 PCT.VOC: 12.6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8024-43-9	PERFUME	50.00	0.00	0.00
43214	75-28-5	ISOBUTANE	58.12	39.68	45.47
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	37.70	41.78
43308	111-76-2	BUTYL CELLOSOLVE	118.17	22.62	12.75

Table B-10

FORMULATION PROFILES FOR WINDOW AND GLASS CLEANERS

(Continued)

FORMULATION : 8 PCT.VOC: 12.6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8024-43-9	PERFUME	50.00	0.00	0.00
43214	75-28-5	ISOBUTANE	58.12	39.68	45.47
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	37.70	41.78
43308	111-76-2	BUTYL CELLOSOLVE	118.17	22.62	12.75

FORMULATION : 9 PCT.VOC: 12.6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8024-43-9	PERFUME	50.00	0.00	0.00
43214	75-28-5	ISOBUTANE	58.12	39.68	45.47
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	37.70	41.78
43308	111-76-2	BUTYL CELLOSOLVE	118.17	22.62	12.75

FORMULATION : 10 PCT.VOC: 9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	88.89	94.02
43308	111-76-2	BUTYL CELLOSOLVE	118.17	11.11	5.98

Table B-10

FORMULATION PROFILES FOR WINDOW AND GLASS CLEANERS

(Continued)

FORMULATION : 11 PCT.VOC: 7

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8024-43-9	PERRFUME	50.00	0.00	0.00
43301	67-56-1	METHYL ALCOHOL	32.04	100.00	100.00

FORMULATION : 12 PCT.VOC: 18

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8024-43-9	PERFUME	50.00	0.00	0.00
43301	65-56-1	METHYL ALCOHOL	32.04	100.00	100.00

FORMULATION : 13 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 14 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-10

FORMULATION PROFILES FOR WINDOW AND GLASS CLEANERS

(Continued)

FORMULATION : 15 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 16 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-11

FORMULATION PROFILES FOR HERBICIDES AND FUNGICIDES

FORMULATION : 1

PCT.VOC: 95

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000		AROMATIC HYDRCARBONS (PRIMARILY XYLENES)	92.10	100.00	100.00

FORMULATION : 2

PCT.VOC: 59.2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		INERT INGREDIENTS	50.00	100.00	100.00

FORMULATION : 3

PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 4

PCT.VOC: 25

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000	64742-94-5	AROMATIC PETROLEUM SOLVENT	50.00	100.00	100.00

Table B-11

FORMULATION PROFILES FOR HERBICIDES AND FUNGICIDES

(Continued)

FORMULATION : 5 PCT.VOC: 10.75

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43301	67-56-1	METHYL ALCOHOL	32.04	50.00	60.95
45000	64742-94-5	AROMATIC PETROLEUM SOLVENT	50.00	50.00	39.05

FORMULATION : 6 PCT.VOC: 81

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000	64742-94-5	HEAVY AROMATIC NAPHTHA	50.00	100.00	100.00

FORMULATION : 7 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 8 PCT.VOC: 16.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43301	67-56-1	METHYL ALCOHOL	32.04	50.00	60.95
45000	64742-94-5	HEAVY AROMATIC NAPHTHA	50.00	50.00	39.05

Table B-11

FORMULATION PROFILES FOR HERBICIDES AND FUNGICIDES

(Continued)

FORMULATION : 9 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 10 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 11 PCT.VOC: 92.92

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC PETROLEUM DISTILLATES	50.00	89.61	94.82
45102	1330-20-7	ISOMERS OF XYLENE	106.17	10.39	5.18

FORMULATION : 12 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-11

FORMULATION PROFILES FOR HERBICIDES AND FUNGICIDES

(Continued)

FORMULATION : 13 PCT.VOC: 25

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000		PETROLEUM DISTILLATES	50.00	100.00	100.00

FORMULATION : 14 PCT.VOC: 42.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000		PETROLEUM DISTILLATES	50.00	100.00	100.00

Table B-12

FORMULATION PROFILES FOR PERSONAL DEODORANTS

FORMULATION : 1 PCT.VOC: 79.5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43204	74-98-6	PROPANE	19.75	15.70	21.17
43212	106-97-8	N-BUTANE	3.02	2.40	2.97
43214	75-28-5	ISOBUTANE	77.23	61.40	75.87

FORMULATION : 2 PCT.VOC: 43.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43369	57-55-6	PROPYLENE GLYCOL	76.11	100.00	100.00

FORMULATION : 3 PCT.VOC: 75.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43214	75-71-8	ISOBUTANE	48.04	98.94	98.90
43302	64-17-5	ETHYL ALCOHOL	46.07	1.06	1.10

Table B-13

FORMULATION PROFILES FOR AUTO ANTIFREEZES

FORMULATION : 1 PCT.VOC: 90.25

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43370	107-21-1	ETHYLENE GLYCOL	62.1	95.01	97.02
43373	111-46-6	DIETHYLENE GLYCOL	106.0	4.99	2.98

Table B-14

FORMULATION PROFILES FOR CARBURETOR AND CHOKE CLEANERS

FORMULATION : 1 PCT.VOC: 89.2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43212	106-97-8	BUTANE	58.12	12.00	19.22
43815	107-06-2	ETHYLENE DICHLORIDE	99.00	63.00	59.26
45605	1319-77-3	CRESOL (O-,M-,P-)	108.13	25.00	21.53

FORMULATION : 2 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000		ALIPHATIC HYDROARBONS	86.17	88.00	83.16
43212	106-97-8	N-BUTANE	58.12	12.00	16.82

FORMULATION : 3 PCT.VOC: 50

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43212	106-97-8	N-BUTANE	58.12	24.00	32.29
43302	64-17-5	ETHYL ALCOHOL	46.01	11.00	18.70
43815	107-06-2	ETHYLENE DICHLORIDE	99.00	30.00	23.70
45605	1319-77-3	CRESOL (O-,M-,P-)	108.13	35.00	25.31

Table B-14

FORMULATION PROFILES FOR CARBURETOR AND CHOKE CLEANERS

(Continued)

FORMULATION : 4 PCT.VOC: 90

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43301	67-56-1	METHYL ALCOHOL	32.04	11.11	26.94
43321	97-99-4	TETRAHYDROFURFURYL ALCOHOL	102.12	11.11	8.45
43551	67-64-1	ACETONE	58.08	5.56	7.43
45102	1330-20-7	ISOMERS OF XYLENE	106.17	33.33	24.39
45202	108-88-3	TOLUENE	92.10	38.89	32.80

FORMULATION : 5 PCT.VOC: 75.3

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43802	75-09-2	METHYLENE CHLORIDE	84.93	42.10	53.19
45605	1319-77-3	CRESYLIC ACID	108.13	15.80	15.68
45700		COMPLEX AMINES	73.14	.53	.78
45805	95-50-1	O-DICHLOROBENZENE	147.00	41.57	30.34

Table B-15

FORMULATION PROFILES FOR BRAKE CLEANERS

FORMULATION : 1 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43301	67-56-1	METHYL ALCOHOL	32.04	100.00	100.00

FORMULATION : 2 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.67	100.00	100.00

FORMULATION : 3 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	100.00	100.00

Table B-16

FORMULATION PROFILES FOR ENGINE DEGREASERS

FORMULATION : 1 PCT.VOC: 25

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	100.00	100.00

FORMULATION : 2 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION :3 PCT.VOC: 79.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43215	8008-20-6	KEROSENE	50.00	100.00	100.00

FORMULATION : 4 PCT.VOC: 80

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000		AROMATIC 150 SOLVENT	50.00	100.00	100.00

Table B-16

FORMULATION PROFILES FOR ENGINE DEGREASERS

(Continued)

FORMULATION : 5 PCT.VOC: 81

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

FORMULATION : 6 PCT.VOC: 40

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000		AROMATIC 150 SOLVENT	50.00	100.00	100.00

FORMULATION : 7 PCT.VOC: 40

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45000	64742-94-5	HEAVY AROMATIC NAPTHA	50.00	100.00	100.00

FORMULATION : 8 PCT.VOC: 54.2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	136.23	37.27	18.06
43125	8008-20-6	KEROSENE	50.00	59.04	77.95
43777	141-43-5	ETHANOLAMINE	61.08	3.69	3.99

Table B-16

FORMULATION PROFILES FOR ENGINE DEGREASERS

(Continued)

FORMULATION : 9 PCT.VOC: 94.8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43125	8008-20-6	KEROSENE	50.00	87.03	94.62
43308	111-76-2	BUTYL CELLOSOLVE	118.17	2.22	1.02
43777	141-43-5	ETHANOLAMINE	61.08	1.48	1.31
43817	127-18-4	PERCHLOROETHYLENE	165.83	9.28	3.04

FORMULATION : 10 PCT.VOC: 80

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	25.00	12.36
43125	8008-20-6	KEROSENE	50.00	75.00	87.64

FORMULATION : 11 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

Table B-17

FORMULATION PROFILES FOR ENGINE STARTING FLUIDS

FORMULATION : 1 PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43351	60-29-7	ETHYLETHER	74.12	100.00	100.00

Table B-18

FORMULATION PROFILES FOR RUG AND UPHOLSTERY CLEANERS

FORMULATION : 1 PCT.VOC: 8

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	100.00	100.00

FORMULATION : 2 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 3 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 4 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-18

FORMULATION PROFILES FOR RUG AND UPHOLSTERY CLEANERS

(Continued)

FORMULATION : 5 PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 6 PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 6 PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 7 PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

Table B-18

FORMULATION PROFILES FOR RUG AND UPHOLSTERY CLEANERS

(Continued)

FORMULATION : 8 PCT.VOC: .9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00
		PERFUME	50.00	0.00	0.00

FORMULATION : 9 PCT.VOC: 9.1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	17.58	9.79
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	82.42	90.21
		PERFUME	50.00	0.00	0.00

FORMULATION : 10 PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 11 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

Table B-18

FORMULATION PROFILES FOR RUG AND UPHOLSTERY CLEANERS

(Continued)

FORMULATION : 12

PCT.VOC: 1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 13

PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 14

PCT.VOC: .6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00
		PERFUME	50.00	0.00	0.00

FORMULATION : 15

PCT.VOC: 8.6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	1.23	.63
43214	75-28-5	ISOBUTANE	48.04	98.77	99.37
		PERFUME	50.00	0.00	0.00

Table B-18

FORMULATION PROFILES FOR RUG AND UPHOLSTERY CLEANERS

(Continued)

FORMULATION : 16 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 17 PCT.VOC: 4

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISOPROPYL ALCOHOL	118.17	100.00	100.00

FORMULATION : 18 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 19 PCT.VOC: 3.2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

Table B-18

FORMULATION PROFILES FOR RUG AND UPHOLSTERY CLEANERS

(Continued)

FORMULATION : 20 PCT.VOC: 3.2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 21 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

FORMULATION : 22 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-19

FORMULATION PROFILES FOR LUBRICANTS AND SILICONES

FORMULATION : 1

PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 2

PCT.VOC: 100

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43000	8030-30-6	ALIPHATIC NAPHTHA	50.00	65.00	71.15
43411	3115-49-9	NONYLPHENOXY ACETIC ACID	50.00	0.00	0.00
45479	1330-78-5	TRICRESYL PHOSPHATE	368.37	10.00	1.49
		OXYGENATED ORGANIC ACID	50.00	20.00	21.85
		COLLOIDAL GRAPHITE DISPERSION IN ALIPHATIC NAPHTHA	50.00	5.00	5.47

Table B-20

FORMULATION PROFILES FOR METAL CLEANERS AND POLISHES

FORMULATION : 1 PCT.VOC: 30

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43308	111-76-2	BUTYL CELLOSOLVE	118.17	100.00	100.00

FORMULATION : 2 PCT.VOC: 60.9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43125	8008-20-6	KEROSENE	50.00	94.42	91.55
43301	67-56-1	METHYL ALCOHOL	32.04	5.58	8.45

FORMULATION : 3 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 4 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-20

FORMULATION PROFILES FOR METAL CLEANERS AND POLISHES

(Continued)

FORMULATION : 5 PCT.VOC: 30

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43118	8032-32-4	MINERAL SPIRITS	50.00	100.00	100.00

FORMULATION : 6 PCT.VOC: 6

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43909	68-11-1	THIOGLYCOLIC ACID	92.11	100.00	100.00

FORMULATION : 7 PCT.VOC: .9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45707	95-14-7	BENZOTRIAZOLE	119.10	100.00	100.00
		PERFUME	50.00	0.00	0.00

FORMULATION : 8 PCT.VOC: 25

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43369	57-55-6	PROPYLENE GLYCOL	76.11	100.00	100.00

Table B-20

FORMULATION PROFILES FOR METAL CLEANERS AND POLISHES

(Continued)

FORMULATION : 9 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43353	34590-94-8	DIPROPYLENE GLYCOL MONOMETHYL ETHER	148.20	100.00	100.00

FORMULATION : 10 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43300	34590-94-8	DIPROPYLENE GLYCOL MONOMETHYL ETHER	148.20	100.00	100.00

FORMULATION : 11 PCT.VOC: 22

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43125	8008-20-6	KEROSENE	50.00	90.91	96.33
43824	79-01-6	TRICHLOROETHYLENE	131.29	3.67	3.67

FORMULATION : 12 PCT.VOC: 2

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	136.23	9.00	10.06
43355	8000-41-7	TERPINEOL	154.11	91.00	89.94

Table B-20

FORMULATION PROFILES FOR METAL CLEANERS AND POLISHES

(Continued)

FORMULATION : 13 PCT.VOC: 25

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
	8002-09-3	PINE OIL	136.23	9.00	10.06
43355	8000-41-7	TERPINEOL	154.11	91.00	89.94

FORMULATION : 14 PCT.VOC: 36

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43125	8008-20-6	KEROSENE	50.00	33.33	53.70
45101	8032-32-4	VM&P NAPTHA	116.00	66.67	46.30

FORMULATION : 15 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 16 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

Table B-20

FORMULATION PROFILES FOR METAL CLEANERS AND POLISHES

(Continued)

FORMULATION : 17 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
		PERFUME	50.00	0.00	0.00

FORMULATION : 18 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 19 PCT.VOC: 0

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
NO VOC					

FORMULATION : 20 PCT.VOC: 7.9

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43304	67-63-0	ISO-PROPYL ALCOHOL	60.10	98.73	99.50
45478	99-76-3	METHYL P-HYDROXYBENZOATE	152.14	1.27	.50

Table B-20

FORMULATION PROFILES FOR METAL CLEANERS AND POLISHES

(Continued)

FORMULATION : 21 PCT.VOC: .1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45478	99-76-3	METHYL P-HYDROXYBENZOATE	152.14	100.00	100.00

FORMULATION : 22 PCT.VOC: .1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45478	99-76-3	METHYL P-HYDROXYBENZOATE	152.14	100.00	100.00

FORMULATION : 23 PCT.VOC: .1

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
45478	99-76-3	METHYL P-HYDROXYBENZOATE	152.14	100.00	100.00

FORMULATION : 24 PCT.VOC: 5

SAROAD NUMBER	CAS NUMBER	SPECIES NAME	MOL. WEIGHT	PCT WT.	PCT. VOL.
43302	64-17-5	ETHYL ALCOHOL	46.07	100.00	100.00

APPENDIX C

RAW DATA ON CONSUMER PRODUCT FORMULATIONS

1. FORMULATION DATA FOR PAINTS, PRIMERS AND VARNISHES

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
1	Ethylene Glycol	62.10	55.50	55.50	.8937	56.32	43370
	Propylene Glycol	76.11	28.70	28.70	.3771	23.76	43369
	Glycol Ethers and Ester Ethers	50.00	14.00	14.00	.2800	17.65	
	Misc.	50.00	1.80	1.80	.0360	2.27	
			100.00				
2	Other Ketones and Esters	50.00	3.80	3.80	.0760	4.89	
	Ethylene Glycol	62.10	26.30	26.30	.4235	27.27	43370
	Propylene Glycol	76.11	50.20	50.20	.6596	42.47	43369
	Glycol Ethers and Ester Ethers	50.00	17.40	17.40	.3480	22.41	
	Misc.	50.00	2.30	2.30	.0460	2.96	
			100.00				
3	Ethylene Glycol	62.10	80.60	80.60	1.2979	77.91	43370
	Glycol Ethers and Ester Ethers	50.00	18.40	18.40	.3680	22.09	
			100.00				
4	Aliphatic HCs	50.00	98.50	98.50	1.9700	99.29	43000
	Isomers of Xylene	106.17	1.50	1.50	.0141	.71	45102
			100.00				
5	Aliphatic HCs	50.00	98.70	98.70	1.9740	99.38	43000
	Isomers of Xylene	106.17	1.30	1.30	.0122	.62	45102
			100.00				
6	Aliphatic HCs	50.00	94.40	94.40	1.8880	95.30	43000
	Iso-propyl Alcohol	60.10	5.60	5.60	.0932	4.70	43304
			100.00				
7	Aliphatic HCs	50.00	98.40	98.40	1.9680	98.67	43000
	Iso-propyl Alcohol	60.10	1.60	1.60	.0266	1.33	43304
			100.00				

Reproduced from
best available copy.

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
8	Iso-propyl Alcohol	60.10	1.30	1.30	.0216	1.21	43304
	Other Ketones and Esters	50.00	43.70	43.70	.8740	49.07	
	Ethylene Glycol	62.10	55.00	55.00	.8857	49.72	43370
			100.00				
9	Other Ketones and Esters	50.00	45.50	45.50	.9100	52.76	
	Ethylene Glycol	62.10	33.30	33.30	.5362	31.09	43370
	Propylene Glycol	76.11	21.20	21.20	.2785	16.15	43369
	Glycol Ethers and Ester Ethers	50.00	trace				
			100.00				
10	Other ketones and Ethers	50.00	34.60	34.60	.6920	39.65	
	Ethylene Glycol	62.10	65.40	65.40	1.0531	60.35	43370
			100.00				
11	Other Ketones and Esters	50.00	24.50	24.50	.4900	28.73	
	Ethylene Glycol	62.10	75.50	75.50	1.2158	71.27	43370
	Glycol Ethers and Ester Ethers	50.00	trace				
			100.00				
12	Aliphatic HCs	50.00	97.80	97.80	1.9560	98.95	43000
	Isomers of Xylene	106.17	2.20	2.20	.0207	1.05	45102
			100.00				
13	Aliphatic HCs	50.00	100.00	100.00	2.0000	100.00	43000
			100.00				
14	Aliphatic HCs	50.00	100.00	100.00	2.0000	100.00	43000
			100.00				
15	Aliphatic HCs	50.00	100.00	100.00	2.0000	100.00	43000
			100.00				
16	Aliphatic HCs	50.00	100.00	100.00	2.0000	100.00	43000
			100.00				
17	Aliphatic HCs	50.00	100.00	100.00	2.0000	100.00	43000
			100.00				

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
18	Aliphatic HCs	50.00	58.00	58.00	1.1600	73.16	43000
	Toluene	92.10	16.20	16.20	.1759	11.09	45202
	Isomers of Xylene	106.17	10.20	10.20	.0961	6.06	45102
	Methylene Chloride	84.93	11.73	11.73	.1381	8.71	43802
	1,1,1-Trichloroethane	133.41	2.07	2.07	.0155	.98	43814
			100.00				

2. FORMULATION DATA FOR HAIR SPRAYS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	# Mol	% Vol	SAROAD CODES
1	Ethyl Alcohol	46.07	47.0	48.45	1.0202	71.16	43301
	Dichlorodifluoromethane	120.90	50.0	51.55	.4136	28.84	43823
			97.0				
2	Ethyl Alcohol	46.07	47.0	48.45	1.0202	71.16	43301
	Dichlorodifluoromethane	120.91	50.0	51.55	.4135	28.84	43823
			97.0				
3	Ethyl Alcohol	46.07	46.0	47.92	.9985	70.71	43301
	Dichlorodifluoromethane	120.91	50.0	52.08	.4135	29.29	43823
			96.0				
4	Ethyl Alcohol	46.07	46.0	47.92	.9985	70.71	43301
	Dichlorodifluoromethane	120.91	50.0	52.08	.4135	29.29	43823
			96.0				
5	Ethyl Alcohol	46.07	46.0	47.92	.9985	70.71	43301
	Dichlorodifluoromethane	120.91	50.0	52.08	.4135	29.29	43823
			96.0				
6	Ethyl Alcohol	46.07	46.0	47.92	.9985	70.71	43301
	Dichlorodifluoromethane	120.91	50.0	52.08	.4135	29.29	43823
			96.0				
7	Ethyl Alcohol	46.07	47.0	48.45	1.0202	71.16	43301
	Dichlorodifluoromethane	120.91	50.0	51.55	.4135	28.84	43823
			97.0				
8	Ethyl Alcohol	46.07	47.0	48.45	1.0202	72.41	43301
	Trichlorofluoromethane	137.36	25.0	25.77	.1820	12.92	43811
	Dichlorodifluoromethane	120.91	25.0	25.77	.2068	14.68	43823
			97.0				

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
9	Ethyl Alcohol	46.07	80.8	92.55	1.7539	94.19	43301
	Iso-propyl Alcohol	60.10	6.5	7.45	.1082	5.81	43304
			87.3				
10	Essential Oil	50.00	.3	.31	.0060	.47	
	Ethyl Alcohol	46.07	36.5	37.71	.7923	62.64	43301
	Dichlorodifluoromethane	120.91	30.0	30.99	.2481	19.62	43823
	Trichlorofluoromethane	137.36	30.0	30.99	.2184	17.27	43811
			96.8				
11	Essential Oil	50.00	.3	.31	.0060	.63	
	Ethyl Alcohol	46.07	10.0	10.42	.2171	22.86	43301
	Dichloromethane	84.93	15.0	15.62	.1766	18.60	43802
	Dichlorodifluoromethane	120.91	35.4	36.82	.2924	30.79	43823
	Trichlorofluoromethane	137.36	35.4	36.82	.2574	27.11	43811
			96.0				
12	Ethyl Alcohol	46.07	4.0	4.17	.0868	9.59	43301
	Essential Oil	50.00	.3	.31	.0060	.66	
	Dichloromethane	84.93	25.0	26.04	.2944	32.50	43902
	Dichlorodifluoromethane	120.91	33.4	34.74	.2758	30.45	43823
	Trichlorofluoromethane	137.36	33.4	34.74	.2428	26.80	43811
			96.0				
13	Essential Oil	50.00	.3	.32	.0060	.47	
	Dichloromethane	84.93	10.0	10.54	.1177	9.25	43802
	Ethyl Alcohol	46.07	34.6	36.46	.7510	58.98	43301
	Dichlorodifluoromethane	120.90	35.0	36.88	.2895	22.73	43823
	Trichlorofluoromethane	137.36	15.0	15.81	.1092	8.58	43811
			94.9				
14	Diethylphthalate	222.20	.1	.11	.0005	.03	43453
	Essential Oil	50.00	.3	.32	.0060	.44	
	Dichloromethane	84.93	15.0	15.79	.1766	12.90	43802
	Ethyl Alcohol	46.07	39.6	41.68	.8596	62.77	43301
	Dichlorodifluoromethane	120.91	36.0	37.89	.2977	21.74	43923
	Trichlorofluoromethane	137.36	4.0	4.21	.0291	2.13	43811
			95.0				
15	Essential Oil	50.00	.3	.30	.0060	.55	
	Dichloromethane	84.93	10.0	10.01	.1177	10.87	43802
	Iso-propyl Alcohol	60.10	29.6	29.63	.4925	45.49	43304
	Dichlorodifluoromethane	120.91	30.0	30.03	.2481	22.91	43823
	Trichlorofluoromethane	137.36	30.0	30.03	.2184	20.17	43811
			99.9				

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
16	Essential Oil	50.00	.3	.32	.0060	.50	
	Ethyl Alcohol	46.07	33.6	35.78	.7293	60.68	43301
	Dichlorodifluoromethane	120.91	30.0	31.95	.2481	20.64	43823
	Trichlorofluoromethane	137.36	30.0	31.95	.2184	18.17	43811
			93.9				
17	Essential Oil	50.00	.3	.31	.0060	.48	
	Ethyl Alcohol	46.07	35.7	37.19	.7749	62.12	43301
	Dichlorodifluoromethane	120.91	30.0	31.25	.2481	19.89	43823
	Trichlorofluoromethane	137.36	30.0	31.25	.2184	17.51	43811
			96.0				
18	Ethyl Alcohol	46.07	28.0	28.57	.6078	52.76	43301
	Trichlorofluoromethane	137.36	35.0	35.71	.2548	22.12	43811
	Dichlorodifluoromethane	120.91	35.0	35.71	.2895	25.13	43823
			98.0				
19	Ethyl Alcohol	46.07	28.0	42.42	.6078	68.49	43301
	Trichlorofluoromethane	137.36	35.0	53.03	.2548	28.71	43811
	Dichlorodifluoromethane	120.90	3.0	4.55	.0248	2.80	43823
			66.0				

2. FORMULATION DATA FOR ALL PURPOSE CLEANERS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
1	No VOC						
2	No VOC						
3	Pine Oil	136.23	10.00	36.36	.0734	20.13	
	Iso-propyl Alcohol	60.10	17.50	63.64	.2912	79.87	43304
			27.50				
4	No VOC						
5	No VOC						
6	No VOC						
7	No VOC						
8	No VOC						
9	Perfume	50.00	trace				
10	Perfume	50.00	trace				
11	No VOC						
12	No VOC						
13	No VOC						
14	No VOC						
15	No VOC						
16	No VOC						
17	No VOC						
18	Perfume	50.00	trace				
19	No VOC						

SAROAD Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	CODE
20	No VOC						
21	Propylene Glycol	76.11	3.50 3.50	100.00	.0460	100.00	43369
22	Propylene Glycol	76.11	3.50 3.50	100.00	.0460	100.00	43369
23	Perfume	50.00	trace				
24	Propylene Glycol	76.11	3.50 3.50	100.00	.0460	100.00	43369
25	No VOC						
26	No VOC						
27	No VOC						
28	No VOC						
29	No VOC						
30	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
31	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
32	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
33	No VOC						
34	No VOC						
35	Pine Oil	50.00	15.00	35.71	.3000	35.71	
	Kerosene	50.00	27.00 42.00	64.29	.5400	64.29	43125

SAROAD Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	CODE
36	Kerosene	50.00	30.00	90.91	.6000	90.91	43125
	Pine Oil	50.00	3.00	9.09	.0600	9.09	
			33.00				
37	No VOC						
38	Propylene Glycol	76.11	6.00	100.00	.0788	100.00	43369
			6.00				
39	No VOC						
40	No VOC						
41	No VOC						
42	No VOC						
43	No VOC						
44	No VOC						
45	No VOC						
46	No VOC						
47	No VOC						
48	No VOC						
49	No VOC						
50	No VOC						
51	No VOC						
52	Perfume	50.00	trace				
53	Perfume	50.00	trace				
54	Methyl Cellosolve	76.11	2.00	100.00	.0263	100.00	43310
			2.00				

SAROAD Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	CODE
55	Butyl Cellosolve	118.17	5.00 5.00	100.00	.0423	100.00	43308
56	No VOC						
57	No VOC						
58	No VOC						
59	No VOC						
60	No VOC						
61	No VOC						
62	No VOC						
63	No VOC						
64	No VOC						
65	2-(2-Butoxyethoxy)-ethanol	162.23	3.00 3.00	100.00	.0185	100.00	43312
66	2-(2-Butoxyethoxy)-ethanol	162.23	3.00 3	100.00	.0185	100.00	43312
67	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
68	No VOC						
69	No VOC						
70	No VOC						
71	No VOC						
72	No VOC						
73	Propylene Glycol But.Eth.	132.20	3.00 3.00	100.00	.0227	100.00	43354

SAROAD

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	CODE
74	Butyl Cellosolve	118.17	6.50 6.5	100.00	.0550	100.00	43308
75	Butyl Cellosolve	118.17	5.00 5	100.00	.0423	100.00	43308
76	Butyl Cellosolve	118.17	3.50 3.5	100.00	.0296	100.00	43308
77	Butyl Cellosolve	118.17	5.00 5	100.00	.0423	100.00	43308
78	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
79	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
80	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
81	2-(2-Butoxyethoxy)-ethanol	162.23	5.00 5	100.00	.0308	100.00	43312
82	Butyl Cellosolve	118.17	10.00 10	100.00	.0846	100.00	43308
83	Butyl Cellosolve	118.17	8.50 8.50	100.00	.0719	100.00	43308
84	Butyl Cellosolve	118.17	6.00 6.00	100.00	.0508	100.00	43308
85	2-(2-Butoxyethoxy)-ethanol	162.23	10.00 10.00	100.00	.0616	100.00	43312

Reproduced from best available copy.

SAROAD Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	CODE
86	No VOC						
87	No VOC						
88	Ethanolamine	61.01	2.00	100.00	.0328	100.00	43777
			2.00				
89	No VOC						
90	No VOC						
91	No VOC						
92	No VOC						
93	Butyl Cellosolve	118.17	8.00	100.00	.0677	100.00	43308
			8.00				
94	Butyl Cellosolve	118.17	8.00	100.00	.0677	100.00	43308
			8.00				
95	No VOC						
96	Pine Oil	50.00	.67	4.12	.0134	6.59	
	Terpineol	154.11	6.83	42.03	.0443	21.80	43355
	Iso-propyl Alcohol	60.10	8.75	53.85	.1456	71.61	43304
			16.25				
97	Pine Oil	50.00	.67	4.12	.0134	6.59	
	Terpineol	154.11	6.83	42.03	.0443	21.80	43355
	Iso-propyl Alcohol	60.10	8.75	53.85	.1456	71.61	43304
			16.25				
98	Perfume	50.00	trace				
99	2-(2-Butoxyethoxy)-ethanol	162.23	1.00	100.00	.0062	100.00	43318
			1.00				

SAROAD

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	CODE
100	2-(2-Butoxyethoxy)-ethanol	162.23	1.00	100.00	.0062	100.00	43318
			1.00				
101	No VOC						
102	No VOC						
103	Pine Oil	50.00	.90	9.00	.0180	23.36	
	Terpineol	154.11	9.10	91.00	.0590	76.64	43355
			10.00				
104	Pine Oil	50.00	.70	9.33	.0140	24.09	
	Terpineol	154.11	6.80	90.67	.0441	75.91	43355
			7.50				
105	Butyl Cellosolve	118.17	6.00	100.00	.0508	100.00	43308
			6.00				
106	Butyl Cellosolve	118.17	2.65	100.00	.0224	100.00	43308
			2.65				
107	No VOC						
108	No VOC						
109	No VOC						
110	No VOC						
111	Mineral Spirits	50.00	10.00	100.00	.2000	100.00	43118
			10.00				
112	No VOC						
113	No VOC						
114	No VOC						
115	No VOC						

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
116	No VOC						
117	Propylene Glycol	90.10	5.00	98.04	.0555	96.52	43369
	Pine Oil	50.00	.10	1.96	.0020	3.48	
			5.10				
118	No VOC						
119	Butyl Cellosolve	118.17	5.00	100.00	.0423	100.00	43308
			5.00				
120	No VOC						
121	Kerosene	50.00	5.00	17.86	.1000	32.71	43125
	VM&P Naptha	116.00	20.00	71.43	.1724	56.40	45101
	Propylene Glycol	90.10	3.00	10.71	.0333	10.89	43369
			28.00				
122	Butyl Cellosolve	118.17	3.00	100.00	.0254	100.00	43308
			3.00				
123	Butyl Cellosolve	118.17	3.00	100.00	.0254		43308
			3.00				

4. FORMULATION DATA FOR INSECT SPRAYS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Inert Ingredients	50.00	86.50	100.00	1.7300	100.00	
			86.50				
2	DDVP	220.98	20.00	20.00	.0905	5.35	
	Inert Ingredients	50.00	80.00	80.00	1.6000	94.65	
			100.00				
3	Petroleum Distillates	50.00	10.20	10.27	.2040	10.72	43000
	Inert Ingredients	50.00	59.12	59.52	1.1824	62.15	
	N-Butane	58.12	15.00	15.10	.2581	13.57	43121
	Isobutane	58.12	15.00	15.10	.2581	13.57	43214
			99.32				
4	DDVP	220.98	.20	.20	.0009	.05	
	Petroleum Distillates	50.00	1.04	1.05	.0208	1.10	43000
	Inert Ingredients	50.00	67.91	68.49	1.3582	71.63	
	N-Butane	58.12	15.00	15.13	.2581	13.61	43121
	Isobutane	58.12	15.00	15.13	.2581	13.61	
			99.15				

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%VOL	SAROAD CODE
5	Petroleum Distillates	50.00	1.04	1.05	.0208	1.10	43000
	Inert Ingredients	50.00	67.91	68.63	1.3582	71.67	
	N-Butane	58.12	15.00	15.16	.2581	13.62	43121
	Isobutane	58.12	15.00	15.16	.2581	13.62	43214
			98.95				
6	Petroleum Distillates	50.00	11.83	11.85	.2366	12.37	43000
	Inert Ingredients	50.00	58.00	58.10	1.1600	60.64	
	N-Butane	58.12	15.00	15.03	.2581	13.49	43121
	Isobutane	58.12	15.00	15.03	.2581	13.49	43214
			99.83				
7	Petroleum Distillates	50.00	8.05	8.17	.1610	8.53	43000
	Inert Ingredients	50.00	60.50	61.39	1.2100	64.12	
	N-Butane	58.12	15.00	15.22	.2581	13.68	43121
	Isobutane	58.12	15.00	15.22	.2581	13.68	43214
			98.55				
8	No VOC						
9	Pine Oil	136.23	.90	.90	.0066	.35	
	Petroleum Distillates	50.00	.40	.40	.0080	.42	43000
	Inert Ingredients	50.00	68.61	68.67	1.3722	72.11	
	N-Butane	58.12	15.00	15.01	.2581	13.56	43121
	Isobutane	58.12	15.00	15.01	.2581	13.56	43214
			99.91				
10	Insecticide Solution in Kerosene	50.00	15.50	27.93	.3100	31.05	
	N-Butane	58.12	40.00	72.07	.6882	68.95	43121
			55.50				

5. FORMULATION DATA FOR CAR POLISHES AND WAXES

Formula	Compound	Mol. Wt.	% Wt.VOC	% Wt.	# Mol.	%Vol.	SAROAD CODE
1	Faxam 22	50.00	5.00	47.62	.1000	48.95	
	Diethylaminoethanol	117.07	.50	4.76	.0043	2.09	43700
	Mineral Spirits	50.00	5.00	47.62	.1000	48.95	43118
			10.50				
2	Solvent	50.00	22.50	100.00	.4500	100.00	
3	No VOC						

Formula	Compound	Mol. Wt.	% Wt.VOC	% Wt.	# Mol.	%Vol.	SAROAD CODE
4	Mineral Spirits	50.00	32.00	94.12	.6400	96.53	43118
	Morpholine	87.04	2.00	5.88	.0230	3.47	43742
			35.50				
5	Mineral Spirits	50.00	32.00	97.26	.6400	98.41	43118
	Morpholine	87.04	.90	2.74	.0103	1.59	
			32.90				
6	Morpholine	87.04	2.00	100.00	.0230	100.00	43742
			2.00				
7	Mineral Spirits	50.00	23.28	100.00	.4656	100.00	43118
			23.28				
8	Morpholine	87.04	.40	100.00	.0046	100.00	43742
			.40				
9	Kerosene	50.00	10.00	32.47	.2000	32.83	43125
	Morpholine	87.04	.80	2.60	.0092	1.51	43742
	Mineral Spirits	50.00	20.00	64.94	.4000	65.66	43118
			30.80				
10	Kerosene	50.00	10.00	37.88	.2000	37.88	43125
	Mineral Spirits	50.00	16.40	62.12	.3280	62.12	43118
			26.40				
11	Kerosene	50.00	10.00	42.55	.2000	44.37	43125
	Mineral Spirits	50.00	11.00	46.81	.2200	48.80	43118
	Morpholine	87.04	2.10	8.94	.0241	5.35	43742
	Iso-propyl Alcohol	60.10	.40	1.70	.0067	1.48	43304
			23.50				
12	Mineral Spirits	50.00	11.00	50.00	.2200	50.10	43118
	Solvent L-40	50.00	10.75	48.86	.2150	48.96	
	Iso-propyl Alcohol	60.10	.25	1.14	.0042	.95	43304
			11.11				
13	Kerosene	50.00	10.00	38.24	.2000	38.27	43125
	Mineral Spirits	50.00	16.03	61.30	.3206	61.35	43118
	Iso-propyl Alcohol	60.10	.12	.46	.0020	.38	43304
			26.15				
14	No VOC						
15	Kerosene	50.00	.25	.43	.0050	.43	43125
	Mineral Spirits	50.00	57.25	99.57	1.1450	99.57	43118
			57.75				

Formula	Compound	Mol. Wt.	% Wt.VOC	% Wt.	# Mol.	%Vol.	SAROAD CODE
16	Kerosene	50.00	12.50	17.92	.2500	17.92	43125
	Mineral Spirits	50.00	57.25	82.08	1.1450	82.08	43118
			70.00				
17	Mineral Spirits	50.00	16.00	61.54	.3200	61.54	43118
	Kerosene	50.00	10.00	38.46	.2000	38.46	43125
			26.00				
18	Solvent L-410	50.00	9.50	100.00	.1900	100.00	
			9.50				
19	No VOC						
20	Mineral Spirits	50.00	96.00	100.00	1.9200	100.00	43118
			96.00				
21	No VOC						
22	No VOC						
23	No VOC						
24	Mineral Spirits	50.00	94.00	100.00	1.8800	100.00	43118
			94.00				
25	Mineral Spirits	50.00	4.00	74.07	.0800	83.26	43118
	Morpholine	87.04	1.40	25.93	.0161	16.74	43742
			1.80				
26	Solvent L-140	50.00	17.00	97.14	.3400	97.61	
	Iso-propyl Alcohol	60.10	.50	2.86	.0083	2.39	43304
			17.50				
27	No VOC						
28	Mineral Spirits	50.00	15.00	48.39	.3000	49.06	43118
	Kerosene	50.00	15.00	48.39	.3000	49.06	43000
	Morpholine	87.04	1.00	3.23	.0115	1.88	43742
			31.00				
29	Mineral Spirits	50.00	35.60	100.00	.7120	100.00	43118
			35.60				
30	Mineral Spirits	50.00	72.70	100.00	1.4540	100.00	43118
			72.70				
31	Mineral Spirits	50.00	78.18	100.00	1.5636	100.00	43118
			78.18				

Formula	Compound	Mol Wt	%Wt	%WtVOC	#Mol	%Vol	SAROAD CODE
32	Mineral Spirits	50.00	23.60	100.00	.4720	100.00	43118
			23.26				
33	Mineral Spirits	50.00	27.50	88.42	.5500	93.01	43118
	Morpholine	87.04	3.60	11.58	.0414	6.99	43742
			31.10				
34	Mineral Spirits	50.00	36.00	90.00	.7200	94.00	43318
	Morpholine	87.04	4.00	10.00	.0460	6.00	43742
			40.00				

6. FORMULATION DATA FOR ROOM DEODORANTS AND DISINFECTANTS

Formula	Compound	Mol Wt	%Wt	%WtVOC	#Mol	%Vol	SAROAD CODE
1	Isopropyl Alcohol	60.10	86.5	99.43	1.4393	99.31	43304
	Perfume	50.00	.5	.57	.0100	.69	
			87.0				
2	Propylene Glycol	76.11	10.8	11.37	.1419	8.76	43369
	Ethyl Alcohol	46.07	48.0	50.53	1.0419	64.32	43302
	Methylene Chloride	84.93	35.0	36.84	.4121	25.44	43802
	Perfume	50.00	1.2	1.26	.0240	1.48	
			95.0				
3	Perfume	50.00	.5	.97	.0100	1.15	
	Propylene Glycol	76.11	3.0	5.83	.0394	4.53	43369
	Isopropyl Alcohol	60.10	8.0	15.53	.1331	15.29	43304
	N-Butane	58.12	40.0	77.67	.6882	79.04	43312
			51.5				
4	Perfume	50.00	.5	1.41	.0100	1.63	
	N-Butane	58.12	35.0	98.59	.6022	98.37	43312
			35.5				

7. FORMULATION DATA FOR CONSUMER ADHESIVES

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Petroleum Oil	50.00	3.00	100.00	.0600	100.00	43000
			3.00				
2	No VOC						
3	No VOC						
4	Petroleum Oil	50.00	12.00	100.00	.2400	100.00	43000
			12.00				
5	Toluene	92.10	80.00	100.00	.8686	100.00	43370
			80.00				
6	Camphore	152.24	6.00	7.06	.0394	2.88	
	Acetone	58.08	11.00	12.94	.1894	13.84	43551
	Ethyl Alcohol 74 OP	46.07	44.00	51.76	.9551	69.80	
	Amyl Acetate	130.20	24.00	28.24	.1843	13.47	43436
			85.00				
7	Tricresyl Phosphate	368.37	2.00	3.37	.0054	.79	
	Tescol	62.07	11.40	19.19	.1837	26.63	43300
	Toluene	92.10	43.00	72.39	.4669	67.70	43370
	Nitropropane (1-,2-)	89.09	3.00	5.05	.0337	4.88	43755
			59.40				

8. FORMULATION DATA FOR CAULKING AND SEALING COMPOUNDS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODES
1	Isomers of Xylene	106.17	10.0	83.33	.0942	73.89	45102
	Iso-propyl Alcohol	60.10	2.0	16.67	.0333	26.11	43304
			12.0				
2	Isomers of Xylene	106.17	20.0	100.00	.1884	100.00	45102
			20.0				
3	No VOC						

9. FORMULATION DATA FOR MOTH CONTROL PRODUCTS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	% Vol	SAROAD CODE
1	Petroleum Distillate	50.00	52.95	54.06	1.0590	54.06	43000
	Inert Ingredients	50.00	45.00	45.94	.9000	45.94	
			97.95				
2	Isoparaffinic HC's	86.18	7.75	7.78	.0899	4.67	43000
	Inert Ingredients	50.00	91.85	92.22	1.8370	95.33	
			99.60				
3	P-Dichlorobenzene	147.00	100.00	100.00	.6803	100.00	45807
			100				

10. FORMULATION DATA FOR WINDOW AND GLASS CLEANERS

Formula	Compound	Mol Wt	%WtVOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Iso-propyl Alcohol	60.10	12.5	100.00	.2080	100.00	43304
			12.5				
2	Iso-propyl Alcohol	60.10	10.0	100.00	.1664	100.00	43304
			10.0				
3	Iso-propyl Alcohol	60.10	8.0	100.00	.1331	100.00	43304
	Perfume	50.00	trace	0.00	0.0000	0.00	
			8.0				
4	Iso-propyl Alcohol	60.10	9.6	70.59	.1597	68.60	43304
	Propane	44.11	.8	5.79	.0179	7.67	43204
	Isobutane	58.12	.1	.88	.0021	.89	43214
	N-Butane	58.12	3.1	22.74	.0532	22.85	43212
	Perfume		trace	0.00	0.0000	0.00	
			13.6				
5	Iso-propyl Alcohol	60.10	47.5	100.00	.7903	100.00	43304
			47.5				
6	Iso-propyl Alcohol	60.10	7.7	60.00	.1278	63.09	43304
	Propane	44.11	.6	4.92	.0143	7.06	43204
	Isobutane	58.12	.1	.75	.0017	.82	43214
	N-Butane	58.12	2.5	19.32	.0426	21.01	43212
	Butyl Cellosolve	118.17	1.9	15.00	.0162	8.02	43308
			12.8				

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODES
7	Iso-propyl Alcohol	60.10	4.8	37.70	.0790	41.78	43304
	Isobutane	58.12	5.0	39.68	.0860	45.47	43214
	Butyl Cellosolve	118.17	2.9	22.62	.0241	12.75	43308
	Perfume	50.00	trace				
			12.6				
8	Isopropanol	60.10	4.8	37.70	.0790	41.79	43304
	Butyl Cellosolve	118.17	2.9	22.62	.0241	12.75	43308
	Isobutane	58.12	5.0	39.68	.0860	45.47	43214
	Perfume	50.00	trace				
			22.6				
9	Iso-propyl Alcohol	60.10	4.8	37.70	.0790	41.78	43304
	Butyl Cellosolve	118.17	2.9	22.62	.0241	12.75	43308
	Iso-propyl Alcohol	58.12	5.0	39.68	.0860	45.47	43304
	Perfume	50.00	trace				
			22.6				
10	Iso-propyl Alcohol	60.10	8.0	88.89	.1331	94.02	43304
	Butyl Cellosolve	118.17	1.0	11.11	.0085	5.98	43308
			9.0				
11	Methyl Alcohol	32.04	7.0	100.00	.2185	100.00	43301
	Perfume		trace				
			7.0				
12	Methyl Alcohol	32.04	18.0	100.00	.5618	100.00	43301
	Perfume		trace	0.00	0.0000	0.00	
			18.0				
13	No VOC						
14	No VOC						
15	No VOC						
16	No VOC						

11. FORMULATION DATA FOR HERBICIDES AND FUNGICIDES

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
	Herbicides						
1	Aromatic HCs(Primarily Xylenes)	92.10	95.00	100.00	1.0315	100.00	45000
			95.00				

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
2	Inert Ingredients	50.00	59.20	100.00	1.1840	100.00	
			59.20				
3	No VOC						
4	Aromatic Petroleum Solvent	50.00	25.00	100.00	.5000	100.00	45000
			25.00				
5	Aromatic Petroleum Solvent	50.00	5.38	50.00	.1075	39.05	45000
	Methyl Alcohol	32.04	5.38	50.00	.1678	60.95	43301
			10.75				
6	Heavy Aromatic Naptha	50.00	81.00	100.00	1.6200	100.00	45000
			81.00				
7	No VOC						
8	Heavy Aromatic Naptha	50.00	9.40	50.00	.1880	39.05	45000
	Methyl Alcohol	32.04	9.40	50.00	.2934	60.95	43301
			16.80				
9	No VOC						
10	No VOC						
11	Aliphatic Petroleum Distillates	50.00	83.27	89.61	1.6654	94.82	43000
	Isomers of Xylene	106.17	9.65	10.39	.0909	5.18	45102
			92.92				
	Fungicides						
12	No VOC						
13	Petroleum Distillates	50.00	25.00	100.00	.5000	100.00	43000
			25.00				
14	Petroleum Distillates	50.00	42.50	100.00	.8500	100.00	43000
			42.50				

12. FORMULATION DATA FOR PERSONAL DEODORANTS

Formula	Compuond	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Propane	44.03	15.7	19.75	.3566	21.17	43203
	Isobutane	48.04	61.4	77.23	1.2781	75.87	43214
	N-Butane	48.04	2.4	3.02	.0500	2.97	43212
			79.5				
2	Propylene Glycol	76.11	43.8	100.00	.5755	100.00	43369
			43.8				
3	Ethyl Alcohol	46.07	.8	1.06	.0174	1.10	43302
	Isobutane	48.04	75.0	98.94	1.5612	98.90	43214
			75.8				

13. FORMULATION DATA FOR AUTO ANTIFREEZES

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Ethylene Glycol	62.10	85.75	95.01	1.38	97.02	43370
	Diethylene Glycol	106.12	4.50	4.99	.04	2.98	43373
			90.25				

14. FORMULATION DATA FOR CARBURETOR AND CHOKE CLEANERS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Ethylene Dichloride	99.00	56.2	63.00	.5677	59.26	43815
	Cresol (o-,m-,p-)	108.13	22.3	25.00	.2062	21.53	45605
	N-Butane	58.12	10.7	12.00	.1841	19.22	43212
			89.2				
2	Aliphatic HC s	86.17	88.0	88.00	1.0212	83.18	43100
	N-Butane	58.12	12.0	12.00	.2065	16.82	43212
			100.0				
3	Cresol	108.13	17.5	35.00	.1618	25.31	45605
	Ethylene Dichloride	99.00	15.0	30.00	.1515	23.70	43815
	Ethyl Alcohol	46.01	5.5	11.00	.1195	18.70	43302
	N-Butane	58.12	12.0	24.00	.2065	32.29	43212
			50.0				

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
4	Tetrahydrofurfuryl Alcohol	102.12	10.0	11.11	.0979	8.45	43321
	Isomers of Xylene	106.17	30.0	33.33	.2826	24.39	45102
	Toluene	92.10	35.0	38.89	.3800	32.80	45202
	Acetone	58.08	5.0	5.56	.0861	7.43	43551
	Methyl Alcohol	32.04	10.0	11.11	.3121	26.94	43301
			90.0				
5	Cresylic Acid	108.13	11.9	15.80	.1101	15.68	45605
	Methylene Chloride	84.93	31.7	42.10	.3732	53.19	43802
	O-Dichlorobenzene	147.00	31.3	41.57	.2129	30.34	45805
	Complex Amines	73.14	.4	.53	.0055	.78	45700
			75.3				

15. FORMULATION DATA FOR BRAKE CLEANERS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Methyl Alcohol	32.04	100.0	100.00	3.12	100.00	43302
			100.0				
2	Ethyl Alcohol	46.67	100.0	100.00	2.14	100.00	43301
			100.0				
3	Iso-propyl Alc	60.10	100.0	100.00	1.66	100.00	43304
			100.0				

16. FORMULATION DATA FOR ENGINE DEGREASERS

Formula	Compound	Mol. Wt.	%Wt.VOC	%Wt.	# Mol.	% Vol	SAROAD CODE
1	Iso-propyl Alcohol	60.1	25.0	100.00	.4160	100.00	43304
			25.0				
2	No VOC						
3	Kerosene	50.0	79.8	100.00	1.5960	100.00	43125
			79.8				
4	Aromatic 150 Solvent	50.0	80.0	100	1.6000	100.00	
			80.0				

Formula	Compound	Mol. Wt.	%Wt.VOC	%Wt.	# Mol.	% Vol	SAROAD CODE
5	Mineral Spirits	50.0	81.0	100.00	1.6200	100.00	43118
			81.0				
6	Aromatic 150 Solvent	50.0	40.0	100.00	.8000	100.00	
7	Heavy Aromatic Naphtha	50.0	40.0	100.00	.8000	100.00	45000
			40.0				
8	Pine Oil	136.23	20.2	37.27	.1483	18.06	
	Ethanolamine	61.08	2.0	3.69	.0327	3.99	43777
	Kerosene	50.0	32.0	59.04	.6400	77.95	43125
			54.2				
9	Perchloroethylene	165.83	6.8	9.28	.0531	3.04	43817
	Kerosene	50.0	82.5	87.03	1.6500	94.62	43125
	Butyl Cellosolve	118.17	2.1	2.22	.0178	1.02	43308
	Ethanolamine	61.08	1.4	1.48	.0229	1.31	43777
			94.8				
10	Butyl Cellosolve	118.17	20.0	25.00	.1692	12.36	43308
	Kerosene —	50.0	60.0	75.00	1.2000	87.64	
			80.0				
11	Butyl Cellosolve	118.17	5.0	100.00	.0423	100.00	43308
			5.0				

17. FORMULATION DATA FOR ENGINE STARTING FLUIDS

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	Ethyl Ether	74.12	100.00	100.00	1.35	100.00	43351
			100.00				

18. FORMULATION DATA FOR RUG AND UPHOLSTERY CLEANERS

Formula	Compound	Mol. Wt.	%Wt.VOC	%Wt.	# Mol.	% Vol	SAROAD CODE
1	Iso-propyl Alcohol	60.10	8.0	100.00	.1331	100.00	43304
			8.0				
2	No VOC						
3	No VOC						

Reproduced from best available copy.

Formula	Compound	Mol. Wt.	%Wt.VOC	%Wt.	# Mol.	% Vol	SAROAD CODE
4	No VOC						
5	Butyl Cellosolve	118.17	1.0	100.00	.0085	100.00	43308
			1.0				
6	Butyl Cellosolve	118.17	1.0	100.00	.0085	100.00	43308
			1.0				
7	Butyl Cellosolve	118.17	1.0	100.00	.0085	100.00	43308
			1.0				
8	Butyl Cellosolve	118.17	.9	100.00	.0076	100.00	43308
	Perfume	50.00	trace				
			.9				
9	Butyl Cellosolve	118.17	1.6	17.58	.0135	9.79	43308
	Iso-propyl Alcohol	60.10	7.5	82.42	.1248	90.21	43304
	Perfume	50.00	trace				
			9.1				
10	Butyl Cellosolve	118.17	1.0	100.00	.0085	100.00	43308
			1.0				
11	Perfume	50.00	trace				
12	Butyl Cellosolve	118.17	1.0	100.00	.0085	100.00	43308
			1.0				
13	No VOC						
14	Butyl Cellosolve	118.17	.1	100.00	.0008	100.00	43308
	Perfume		trace				
			.6				
15	Butyl Cellosolve	118.17	.1	1.23	.0008	.63	43308
	Isobutane	60.10	8.0	98.77	.1331	99.37	43214
	Perfume	50.00	trace				
			8.6				
16	No VOC						
17	Iso-propyl Alcohol	60.10	4.0	100.00	.0666	100.00	43304
			4.0				
18	No VOC						
19	Butyl Cellosolve	118.17	3.2	100.00	.0271	100.00	43308
			3.2				

Reproduced from best available copy.

Formula	Compound	Mol. Wt.	%Wt.VOC	%Wt.	# Mol.	% Vol	SAROAD CODE
20	Butyl Cellosolve	118.17	3.2 3.2	100.00	.0271	100.00	43308
21	Perfume	50.00	trace				
22	No VOC						

19. FORMULATION DATA FOR LUBRICANTS AND SILICONES

Formula	Compound	Mol Wt	%Wt.VOC	%Wt.	#Mol	%Vol	SAROAD CODE
1	No VOC						
2	Colloidal Graphite Dispersion in Aliphatic Naptha	50.00	5.0	5.00	.1000	5.47	
	Oxygenated Organic Acids	50.00	20.0	20.00	.4000	21.89	
	Naphtha (aliphatic)	50.00	65.0	65.00	1.3000	71.15	4300
	Tricresyl Phosphate	368.37	10.0	10.00	.0271	1.49	
	Nonylphenoxy Acetic Acid	50.00	trace 100.0				

20. FORMULATION DATA FOR METAL CLEANERS

Formula	Compound	Mol. Wt	%Wt.VOC	% Wt.	#Mol	% Vol.	SAROAD CODES
1	Butyl Cellosolve	118.17	30.00 30.00	100.00	.2539	100.00	43308
2	Kerosene	50.00	57.50	94.42	1.1500	91.55	43125
	Methyl Alcohol	32.04	3.40 60.90	5.58	.1061	8.45	43301
3	No VOC						
4	No VOC						
5	Mineral Spirits	50.00	30.00 30.00	100.00	.6000	100.00	43118
6	Thioglicolic Acid	92.11	6.00 6.00	100.00	.0651	100.00	43909

Reproduced from best available copy.

Formula	Compound	Mol. Wt	%Wt.VOC	% Wt.	#Mol	% Vol.	SAROAD CODES
7	Benzotriazole	119.10	.90	100.00	.0076	100.00	45707
	Perfume	50.00	trace				
			.90				
8	Propylene Glycol	76.11	25.00	100.00	.3285	100.00	43369
			25.00				
9	Diprop. Glyc. Meth. Ether	148.20	5.00	100.00	.0337	100.00	43353
			5.00				
10	Diprop. Glyc. Meth. Ether	148.20	5.00	100.00	.0337	100.00	43353
			5.00				
11	Kerosene	50.00	20.00	90.91	.4000	96.33	43125
	Trichloroethylene	131.29	2.00	9.09	.0152	3.67	43814
			22.00				
12	Pine oil	136.23	.18	9.00	.0013	10.06	
	Terpineol	154.11	1.82	91.00	.0118	89.94	43355
			2.00				
13	Pine Oil	136.23	2.25	9.00	.0165	10.06	
	Terpineol	154.11	22.75	91.00	.1476	89.94	43355
			25.00				
14	Kerosene	50.00	12.00	33.33	.2400	53.70	43125
	VM&P Naptha	116.00	24.00	66.67	.2069	46.30	
			36.00				
15	No VOC						
16	No VOC						
17	Perfume	50.00	trace				
18	No VOC						
19	No VOC.						
20	Isopropyl Alcohol	60.10	7.80	98.73	.1298	99.50	43304
	Methyl p-Hydroxybenzoate	152.14	.10	1.27	.0007	.50	43478
			7.90				
21	Methyl p-Hydroxybenzoate	152.14	.10	100.00	.0007	100.00	43478
			.10				

Reproduced from best available copy.